Fraction TOPS and BOTTOMS Lesson Plan

This lesson can be used as a REVIEW for 6th graders when beginning a Fraction unit (6th grade standard: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.), OR an introduction to part to whole fraction models, OR as an intervention lesson for later grades. Students will be asked to define numerator and denominator, and apply their understanding of fractions to finding and creating equivalent values in both numerical and picture forms. Students will determine and confirm their answers using the PhET simulation Fractions: Equality.

LEARNING TARGETS:

I can...
- use a variety of fraction models (such as circles, bars, and number lines) to develop an understanding of numerators and denominators and fraction equivalence
- define numerator and denominator in own my own words
- apply my understanding of numerator and denominator to compare fractions

COMMON CORE STATE STANDARDS:
- 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 parts of size 1/b. (Please note that parts of this lesson go beyond the grade 3 expectations limited to fractions with denominators 2, 3, 4, 6, and 8.)
- 4.NF.A.13.NF.A.1 - Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (Please note that parts of this lesson go beyond the grade 4 expectations limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

CCSS Math Practices:
MP1: Make sense of problems and persevere in solving them.
MP4: Model with mathematics.
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP8: Look for and make use of structure.

WORDS WORTH KNOWING:

★ Fraction - the number of parts out of a whole
★ Numerator - the top number of a fraction representing the number of parts
★ Denominator - the bottom number of a fraction representing the total number of equal parts the whole is made up of
★ Equivalent - having the same value

ESSENTIAL QUESTIONS:

1. What is a numerator? When a numerator changes, how does it affect a fraction?
2. What is a denominator? When a denominator changes, how does it affect a fraction?
3. How can you use a variety of models to represent equivalent fractions?
4. How do you identify if fractions are equivalent?

5. What strategies can be used to determine equivalence?

MATERIALS:
- ❏ Chromebook
- ❏ PhET Fractions: Equality simulation (https://phet.colorado.edu/en/simulation/fractions-equality)
- ❏ Fraction Tops and Bottoms activity sheet

ESTIMATED TIME: 50 minutes

Do Now ~ 5 minutes Activate prior knowledge by asking students if they would rather have ⅗ or 9/15 of pizza. Have students turn and talk about their thinking and circle their preference on the activity sheet.	
Play Time - PhET Sim ~ 10 minutes *Teacher will…* ● Distribute activity sheet and ask students to circle their answer to the DO NOW and begin working on **#2 Play Time** on the activity sheet. ● Engage with students as they play with the simulation Possible questions to ask: - What happens when you click the shapes at the top? - Why do you think there are four shapes on the left and two on the right? - What happens when you click the yellow arrow buttons next to the numbers? - How are the yellow arrow buttons different from the green ones? - What's in the bucket? - What can you do with the shapes in the bucket? - What actions change the picture? In what ways? ● Ask students to share what they wrote down as they were playing ● Whole group discussion on possible questions outlined above ● Ensure students have played with all buttons and clicking and dragging and can explain how each action impacts the model	*Students will…* ● Explore the simulation ● Share findings with teacher and peers ● Write down discoveries on activity sheet (complete all of part 2 on activity sheet)

Guided Exploration - 15 minutes *Teacher will…* ● Guide students to answer #3 on the Activity Sheet and discuss with a partner how and why their answer stayed the same or changed. ● Encourage students to answer all of parts #4 and #5. It is up to you if you want students to work individually and then discuss, or partner throughout. ● As students are working, check in <u>Possible questions to ask:</u> - If we are talking about equivalent fractions, can the numerators be the same, but the denominators be different? Why do you think that is? (Guide students to understanding of multiplicative relationship). - When the denominator changes, does the size of the shape change? In other words, does the bigger denominator mean that the pieces are also bigger? - What determines if the parts are bigger or smaller? - How will you remember what a numerator is? Denominator? - If you aren't using the sim or drawing a model, how can you determine if two fractions are equivalent? - Can you have equivalent fractions when the numerator is bigger than the denominator? What's another name for that type of fraction? - After you have decided if two fractions are equivalent, can you explain your reasoning in more than one way?	*Students will…* ● Answer #3 on activity sheet and discuss with partner ● Respond to teacher questions ● Ask teacher or table group questions if help is needed
Summary - 10 minutes *Teacher will…* ● Facilitate a class discussion encouraging a variety of students to share their answers to #3 - 5 on the activity sheet, along with their strategies.	*Students will…* ● Participate in the class discussion ● Check answers while working through each question ● As questions as they arise
Assessment - next day *Teacher will…* ● Direct students to the url on the last page of the activity sheet. ● Circulate and check in with any struggling	*Students will…* ● Record their score on the table on the activity sheet as they play the Fractions: Equality Game

students	● Students should work through all the levels (if they want an extra challenge, they can turn the timer on)