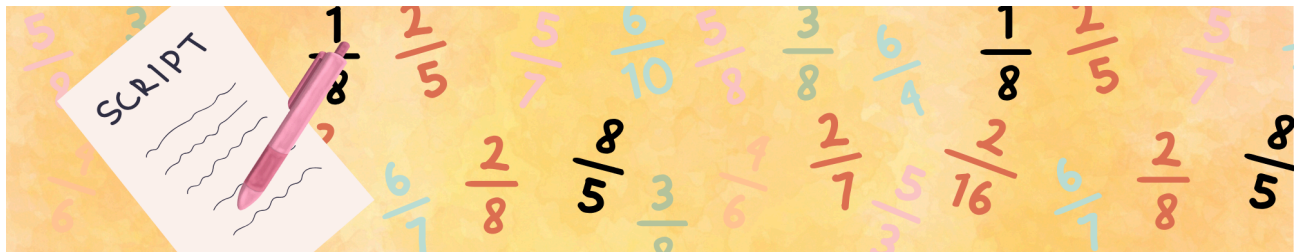# UNIT: ARTFUL EQUATIONS–ADDING AND SUBTRACTING WITH UNLIKE DENOMINATORS
IT'S ABOUT THE, LIKE, DENOMINATORS
Grade Band: 5
Content Focus: Theatre & Math

LEARNING DESCRIPTION

Students will embody fractions, with awareness of their multiple equivalent expressions, to explore adding and subtracting with other fractions with like and unlike denominators.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How do we add and subtract fractions with like and unlike denominators?	I can determine the best way to add and subtract fractions based on their denominators.
How do we work with partners to actively embody and express mathematical concepts?	I can imagine being a fraction and interacting with other fractions to convey math concepts.

GEORGIA STANDARDS

We bring learning to life.

Curriculum Standards	Arts Standards
5. NR.3.3 Model and solve problems involving addition and subtraction of fractions and mixed numbers with unlike denominators.	TA5.PR.1 Act by communicating and sustaining roles in formal and informal environments.

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
5.NSF.1 Add and subtract fractions with unlike denominators (including mixed numbers) using a variety of models, including an area model and number line.	**Anchor Standard 3:** I can act in improvised scenes and written scripts.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
- Fraction - A number that represents a part of a whole - Numerator - The number above the line that indicates how many parts of a whole are being counted - Denominator - The number below the line that indicates the total number of equal parts in the whole - Addition - Combining two or more numbers to find a total or sum - Equation - A mathematical sentence that has two equal sides separated by an equal sign	- Recite – To speak or read a text out loud in a formal or performative manner - Role – A part played by an actor in a play, scene or drama activity - Unison – All together at once

MATERIALS

- Name tags with equivalent fractions groupings (Fraction Role Cards Template)
- Individual dry erase boards or note paper and utensils, if needed
- Image of fraction chant

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

Count-Up
- Class tries to count up from the number one, one voice at a time, randomly. If two people say the same number, a new round starts. Emphasize that it is a listening game. Establish the rule that the same person can't say the first number two rounds in a row. Stop the game and start a new round if a pattern of students participating emerges.
- After Counting Up 1-2-3-etc., count by twos, threes, fours and sixes.
- After Counting Up with whole numbers, use fractions:
    - Unit fractions: 1/2, 1/3, 1/4, 1/5, etc.
    - Equivalent fractions: 1/2, 2/4, 3/6, 4/8, etc.
- Explain that these number and fraction sequences will be useful in the day's lesson.

Work Session

Like Denominators Chant:
- Discuss/review how to add and subtract fractions.
- Introduce the following chant (as a projection, handout, or both):

> **With like denominators**, we just **add** our numerators
> And keep the original shared denominator.
>
> **With unlike denominators**, we'll wait to **add** later
> After we find our common denominator.
>
> **With like denominators,** we **subtract** the lesser numerator
> From the greater, and keep the same denominator.
>
> **With unlike denominators** – we can't **subtract**
> Till we find our common denominator, that's a fact.

- Work with students to find the best rhythm for the language of the chant. Establish a beat and recite the chant in unison.
- Possibly, assign lines to individuals or pairs to recite rhythmically.

Role-Play:
- Assign each student a fraction role with a name tag. Depending on numbers, the same identity may be assigned to two or even three students. Use the accompanying [template] or create tags for the following:
    Hi I'm 1/2, 2/4, 3/6, 4/8
    Hi I'm 1/3, 2/6, 3/9, 4/12
    Hi I'm 2/3, 4/6, 6/9, 8/12
    Hi I'm 1/4, 2/8, 3/12, 4/16
    Hi I'm 3/4, 6/8, 9/12, 12/16
    Hi I'm 1/6, 2/12, 3/18, 4/24
    Hi I'm 5/6, 10/12, 15/18, 2/24
    Hi I'm 1/8, 2/16, 3/24, 4/32
    Hi I'm 3/8, 6/16, 9/24, 12/32
    Hi I'm 5/8, 10/16, 15/24, 20/32
    Hi I'm 7/8, 14/16, 21/24, 28/32

- Have students practice introducing themselves using 'aka' or 'also known as' or, simply, 'or.' E.g., "Hi, I'm 3/4, aka 6/8, aka 9/12, aka 12/16." Let them introduce themselves to one another randomly.
- Have students pair up. After introducing themselves to their partner, have them decide which of their identities to assume. Instruct them that their goal is to add themselves together. Redirect them to the chant and tell them to determine which couplet applies:

  > **With like denominators**, we just **add** our numerators
  > And keep the original shared denominator.

  > **With unlike denominators**, we'll wait to **add** later
  > After we find our common denominator.

- If they have a common denominator, each using one of their several identities, they will use the first couplet. If they have chosen fractions without a common denominator, but can switch to equivalent fractions with a common denominator, they can do that, reciting the second couplet, and then the first. If they cannot find a common denominator, they will use the second couplet. Each pair should recite the appropriate couplet in unison.
- With individual dry erase boards or note paper and utensils, have students write out the calculations that reflect their simple scene. E.g., "3/4 + 3/24 = ?; 9/16 + 2/16 = 11/16".
- This process can be repeated with several partners.
- Then have the students repeat the process but with the instruction that their goal is to subtract. Remind them that they will have to look for common denominators, and also determine which fraction has the greater value and which the lesser. Have them select and recite from the third and fourth couplets:

  > **With like denominators,** we **subtract** the lesser numerator
  > From the greater, and keep the same denominator.

  > **With unlike denominators** – we can't **subtract**
  > Till we find our common denominator, that's a fact.

- Optional: Have students trade roles, so they engage in the process with a new set of equivalent fractions.

Closing/Reflection

- Ask students: What was easy or hard about the activity? What was fun or interesting?
- Ask students: How do we add and subtract fractions with like denominators? With unlike denominators?

ASSESSMENTS

Formative

- The teacher will observe how/whether:
  - Student pairs interact, choose fraction identities, and select and recite the appropriate couplet.
  - Students work together effectively and collaboratively.

- ○ Students use their voices to speak the couplets clearly.
- ○ Students readily assume the roles of fractions.

Summative

- Students accurately write out the equations that reflect their process.

DIFFERENTIATION

Acceleration:
- Add mixed numbers to the collection of fraction roles.

Remediation:
- Direct several pairs in front of the class to model the process clearly.
- Reduce the number of possible roles to simplify the range of choices.

ADDITIONAL RESOURCES

CREDITS

U.S. Department of Education- STEM + the Art of Integrated Learning
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This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.

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