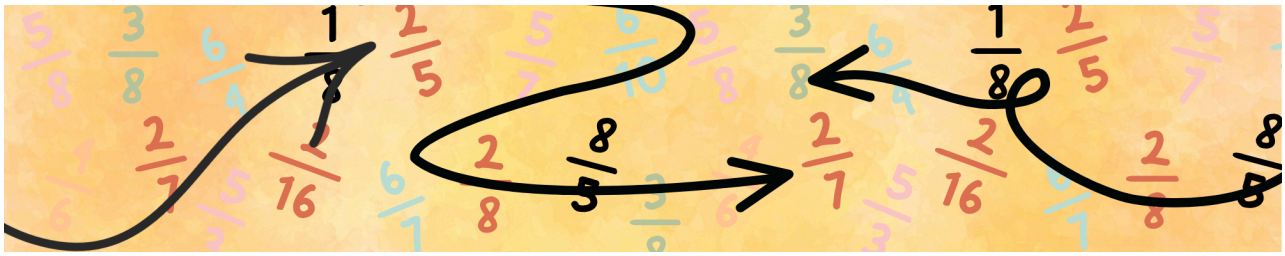
artsNOW
Integrated learning solutions

UNIT: ARTFUL EQUATIONS–ADDING AND SUBTRACTING WITH UNLIKE DENOMINATORS FRACTIONS IN MOTION

Grade Band: 5

Content Focus: Dance & Math



LEARNING DESCRIPTION

In this lesson, students will create addition equations using fractions with unlike denominators. They will work in groups to express this equation in written form and through a movement sequence. The lesson will close with a self-reflection on the project.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How do we add and subtract fractions with like and unlike denominators? How can we represent the process of adding fractions with unlike denominators through written equations and movement?	I can create and express a fraction addition problem (with unlike denominators) in a written equation and a movement sequence that utilizes body shapes, levels, different types of movements, and varying relationships with other dancers.

How can we collaborate with others to show the relationship between fractions in a dance sequence?	

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
5. NR.3.3 Model and solve problems involving addition and subtraction of fractions and mixed numbers with unlike denominators.	ESD5.CR.1 Demonstrate an understanding of the choreographic process. ESD5.CN.3 Integrate dance into other areas of knowledge.

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 1:** I can use movement exploration to discover and create artistic ideas and works. **Anchor Standard 2:** I can choreograph a dance. **Anchor Standard 7:** I can relate dance to other arts disciplines, content areas, and careers.

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	• Movement sequence - A series of movements; a short dance • Levels - One of the aspects of movement (there are three basic levels in dance: high, middle, and low) • Body shape - Refers to an interesting and interrelated arrangement of body parts of one dancer; the visual makeup or molding of the body parts of a singular dancer; the overall visible appearance of a group of dancers (they may be curved/angular, symmetrical/asymmetrical,

• Equation - A mathematical sentence that has two equal sides separated by an equal sign	positive/negative) • Locomotor movement - A movement that travels through space • Non-locomotor movement - A movement that does not travel through space (e.g. shaking, bending, stretching, twisting, turning & more) • Relationship (self to others) - How dancers interact with other dancers in the space (close to, far away from, facing each other, facing different ways, etc.)

MATERIALS

- Upbeat instrumental music
- Speaker or other device w/the ability to play music
- Index cards with various fractions written on them

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

Move It! Shape It!

- Provide a vocabulary word or concept to express through movement.
- When the music plays, students will move in their personal space, to express the vocabulary provided.
  - *Teacher tip: Upbeat instrumental music is best.*
- When the music stops, students will freeze in a body shape.
- Introduce levels (high–standing tall, middle, and low–low to the ground) and locomotor and non-locomotor movements.
- Repeat as needed.

***Vocabulary to utilize**: Numerate, denominator, addition, equation, various locomotor movements, various non-locomotor movements, low level, middle level, high level, facing other students, not facing others, close proximity to others, far proximity to others*

Work Session

- Review adding fractions with like denominators. Next, review how to convert fractions that have different denominators into fractions that have like denominators.
- Divide students into small groups of three to four.
  - Give each group a pair of fraction cards.
  - Each group will write an addition equation with their fraction cards including the sum.
  - Each group will choreograph a movement sequence that expresses their equation. Movement sequences should include the following:

        - Movements:
            - Movement for numerator of Fraction A
            - Movement for denominator of Fraction A
            - Movement for numerator of Fraction B
            - Movement for denominator of Fraction B
            - Movement to represent for converting fractions to find the same denominator
            - Movement for the NEW numerator of Fraction A
            - Movement for the NEW denominator of Fraction A
            - Movement for NEW numerator of Fraction B
            - Movement for NEW denominator of Fraction B
            - Movement for the Sum
        - Students must also include the following when choreographing their movements:
            - Two types of relationships: Self to others (near/far, facing/not facing)
            - At least two non-locomotor movements
            - At least one locomotor movement
            - All three levels (high, middle, and low)
        - Before allowing groups to choreograph, ask them to think about how they would use levels, locomotor/non-locomotor movements, and relationships to express the mathematical concepts.
            - For example, students may say that locomotor movements may show converting fractions; students may say that a high level would represent a numerator and a low level would represent a denominator.
- After work time, all groups will have a 'dress rehearsal'. (All groups perform at the same time and may need two dress rehearsals so that the teacher can assess their work.)
    - After the rehearsals, have each group share their equation.
- Invite groups that would like to perform their dance for the whole class to do so.
    - Review audience etiquette: Still, silent, supportive.
    - After each performance, have students analyze/give feedback on the group's sequence. Students can comment on:
        - Interesting movements
        - Where they saw certain sequence requirements, etc.
        - How the group used the dance concepts to communicate the mathematical concepts

Closing/Reflection

- Have students complete the following exit ticket by answering one or more of the following reflection questions:
    - Describe how your movements expressed the fraction addition equation.
    - What steps did you use to solve the equation?
    - What was the easiest and most challenging part of this project?
    - What did your group do to be successful in this project?
    - What would you change or improve to be more successful?
    - Describe what you learned in this project.

ASSESSMENTS

Formative

- Teacher observation of students during “Move It! Shape It!” to check for understanding of vocabulary
- Individual group check-ins during group work time
- Exit Ticket

Summative

- Checklist for “Fraction Addition Equation and Movement Sequence”
  - Was the fraction addition equation written accurately?
  - Was the sum of the fraction addition equation correct?
  - Did the movement sequence include a movement for each part of the equation? (Fraction A, Fraction B, and Sum)
  - Did the sequence express two types of relationship: Self to others (near/far, facing/not facing)?
  - Did the sequence include at least two non-locomotor movements?
  - Did the movement sequence include at least one locomotor movement?
  - Did the movement sequence include all three levels (low, middle, and high)?

DIFFERENTIATION

Acceleration:

- Include mixed fractions
- Reduce group size

Remediation:

- Simplify fractions given
- Intentional grouping

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.*