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Integrated learning solutions

UNIT: CREATIVE CALCULATIONS–MULTIPLICATION AND DIVISION CREATING AND CALCULATING THROUGH CHOREOGRAPHY

Grade Band: 4

Content Focus: Dance & Math



LEARNING DESCRIPTION

In this lesson, students will collaborate in groups to create a three-part movement phrase using a set list of movement words. They will calculate the total value (ticket price) of their phrase by considering the value assigned to each movement word and the number of repetitions. Additionally, they will determine how much each of the four friends will contribute to the total value (ticket price).

LEARNING TARGETS

Essential Questions	"I Can" Statements
What strategies can be used to connect movement choices to solving equations? How can we use movement to create a sequence that expresses an idea with a clear beginning, middle, and end?	I can work in a group to create a movement phrase with a beginning, middle, and end. I can solve equations based on my movement choices.

In what ways can physical movement be used to represent and solve mathematical equations?	

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
4.NR.2.3 Solve relevant problems involving multiplication of a number with up to four digits by a 1-digit whole number or involving multiplication of two two-digit numbers using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 4.NR.2.5 Solve multi-step problems using addition, subtraction, multiplication, and division involving whole numbers. Use mental computation and estimation strategies to justify the reasonableness of solutions.	ESD4.CR.1.a Explore a variety of choreographic structures, forms, and designs (e.g. AB, ABA, canon, call-response, narrative, complementary/contrasting shapes, symmetry). ESD4.CN.3 Integrate dance into other areas of knowledge.

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
4.NSBT.5 Multiply up to a four-digit number by a one-digit number and multiply a two-digit number by a two-digit number using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using rectangular arrays, area models and/or equations. 4.NSBT.6 Divide up to a four-digit dividend by a one-digit divisor using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.	**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
• Equation - A mathematical sentence that has two equal sides separated by an equal sign • Array - A way of arranging objects or images in rows and columns • Multiplication - Repeated addition of numbers of the same size • Factors - The integers that divide that number without leaving a remainder • Product - The result of multiplying two or more numbers together • Division - Repeated subtraction of numbers of the same size • Dividend - A number that is divided by another number • Divisor - The number by which another number is divided • Quotient - The answer to a division problem	• Movement - How you use your body to do a dance or action • Locomotor movement - A movement that travels through space (e.g. walk, jump, hop, roll, gallop, skip, crawl; etc.) • Non-locomotor movement - A movement that does not travel through space (e.g. shaking, bending, stretching, twisting, turning, etc.) • Choreography - The art of designing and arranging sequences of movements, steps, and gestures to create a dance piece • 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, positive/negative)

MATERIALS

- Paper/index cards to record the movement words and the number of times each movement is performed for the movement phrase
- Paper and pencils to record calculations

INSTRUCTIONAL DESIGN

Opening/Activating Strategy
Warm-Up • Call out a locomotor, such as glide, or non-locomotor movement, such as jump.

- As you count down from eight, students will demonstrate the movement.
- At zero, students should freeze in a body shape of their choice.
- Repeat the process.

Vocabulary to utilize:
- *Non-locomotor Movement: Bend, wiggle, flick, turn, twist, reach*
- *Locomotor Movement: Walk, gallop, skip, jump, crawl, leap*

Work Session

Phrase Creation:
- Working in groups of three to four, students will create a movement phrase with a beginning, middle, and end.
    - Students will choose three movements consisting of:
        - At least one locomotor movement–Students can choose from the following movements: Walk, gallop, skip, jump, crawl, leap.
        - At least one non-locomotor movement–Students can choose from the following movements: Bend, wiggle, flick, turn, twist, reach.
    - Students will determine the number of times that each word will be done in the movement phrase. They must choose from the following:
        - Greater than or equal to eight times
        - Less than or equal to sixteen times
- Students will record the movement words and the number of times each movement is performed.
- Students will then practice their movement phrases.

Calculating Ticket Prices:
- Students must now figure out the total ticket price to see their performances.
- The following values represent the cost of one of each movement

Non-locomotor Movement	**Locomotor Movement**
Bend - $19	Walk - $17
Wiggle - $23	Gallop - $25
Flick - $36	Skip - $30
Turn - $42	Jump - $44
Twist - $58	Crawl - $64
Reach - $70	Leap - $83

- Students should write out the complete equation(s) used to determine the total ticket price for someone to attend their performances.

Ticket Share:
- Using the total ticket price, have students calculate the following: A group of four friends is coming to see your dance. How much does each friend need to contribute to see the dance? How much will it cost them total?

Closing/Reflection
• Have students respond to the following prompt as an exit ticket: Share what you think your group was most successful at in this process. What was the most challenging part for you and/or your group and how did you overcome it?

ASSESSMENTS

Formative
• Teacher observation of students during warm-up to check for understanding of vocabulary • Individual group check-ins during group work time and class sharing of phrases looking for phrase creation and multiplication/division check • Exit Ticket
Summative
• Written equations with products and sums • Student dance phrases that meet the requirements

DIFFERENTIATION

Acceleration:

- Change movement word values and/or the number of friends in the ticket share
- Allow students to develop their own locomotor and non-locomotor movements

Remediation:

- Change movement word values
- Reduce the number of movements total that students must include in their dances

ADDITIONAL RESOURCES

CREDITS

U.S. Department of Education- STEM + the Art of Integrated Learning
Ideas contributed by: Christopher Crabb

**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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