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Integrated learning solutions

MOVEMENT BY CHANCE: EXPLORING DANCE AND DATA PATTERNS
Grade Band: 9-12
Content Focus: Dance & Math



LEARNING DESCRIPTION

Students will explore the concept of chance dance, inspired by Merce Cunningham, while simultaneously developing data interpretation skills. Students will begin by learning about Cunningham's innovative approach, where movements are determined randomly using dice, coins, or digital tools. Working in small groups, they will create short dance sequences by assigning movements to numbers and rolling dice to determine the movements in their choreography. After performing their sequences, students will record data on movement frequency, patterns, and transitions. They will then analyze this data discussing trends and drawing conclusions about how probability influences artistic composition. This lesson merges creative expression with mathematical thinking, encouraging students to see patterns in both dance and data.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How can we use data interpretation to analyze and understand patterns created through chance dance?	I can create a chance dance sequence using randomization. I can analyze movement patterns by collecting and interpreting data. I can use probability to determine the likelihood of using different movements in choreography.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
Statistical Reasoning: SR.DSR.2 Formulate statistical investigative questions of interest to students that can be answered with data SR.DSR.3 Collect data by designing and implementing a plan to address the formulated statistical investigative question. SR.DSR.4 Analyze data by selecting and using appropriate graphical and numerical methods SR.DSR.5 Interpret the results of the analysis, making connections to the formulated statistical investigative question.	DHSD1.CR.1 Demonstrate an understanding of creative/choreographic principles, processes, and structures. DHSD1.CR.2 Demonstrate an understanding of dance as a form of communication. DHSD1.RE.1 Demonstrate critical and creative thinking in all aspects of dance. DHSD1.CN.3 Demonstrate an understanding of dance as it relates to other areas of knowledge.

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
Statistics and Probability: SPMJ.2* Distinguish between experimental and theoretical probabilities. Collect data on a chance event and use the relative frequency to estimate the theoretical probability of that event. Determine whether a given probability model is consistent with experimental results. SPID.1* Select and create an appropriate display, including dot plots, histograms, and box plots, for data that includes only real numbers. SPMD.1 Develop the probability distribution for a random variable defined for a sample space in which a theoretical probability can be calculated and graph the distribution.	**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 3:** I can perform movements using the dance elements. **Anchor Standard 5:** I can describe, analyze, and evaluate a dance.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Data - Facts and statistics collected together for reference or analysis • Analyze - Examine methodically and in detail the constitution or structure of something, especially information,	• Merce Cunningham - American modern dancer and choreographer who developed new forms of abstract dance movement

typically for purposes of explanation and interpretation • Interpret - Explain the meaning of information, words, or actions • Charts - A sheet of information in the form of a table, graph, or diagram • Graphs - A diagram showing the relation between variable quantities, typically of two variables, each measured along one of a pair of axes at right angles • Fraction - A numerical quantity that is not a whole number • Probability - The extent to which an event is likely to occur, measured by the ratio of the favorable cases to the whole number of cases possible.	• Chance Dance - Chance dance is a choreography technique that uses chance to determine the order of a sequence of movements. It can also refer to a movement activity where participants create a dance using a random method like rolling dice. • Choreography - The art of designing and arranging sequences of movements, steps, and gestures to create a dance piece • Choreographer - The person who designs or creates a dance piece • Form - How a dance/choreography is structured (put together)

MATERIALS

- Dice
- Movement cards with sample movements on them
- Data Chart Chance dance template
- Merce cunningham video The Six Sides of Merce Cunningham
- Paper
- Pencil/pens/markers
- Music

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

- Create a short dance with students using a movement list to select from. Example movement list:
  - Jump
  - Hop
  - Clap
  - Turn
  - Slide
  - Change levels
  - Change directions
- Explain to the students that a piece of choreography is a collection of data.
- Using the data/choreography, create a chart/graph to represent all the steps in the dance.
- Explore various types of charts/graphs that can be used to display the data/choreography.
- Ask students how they think probability could be used to choreograph a dance.

Work Session

- Watch the video The Six Sides of Merce Cunningham. Discuss who Merce Cunningham is and how he used the concept of chance to create dances.
- Discuss how this concept applies to dancers and choreographers.
- Break class into groups.
- Give each group a set of movement cards (each group's cards should be the same) and one die.
- After assigning a set number of movements that must be included in the dance, have students assign a numerical value (one to six) to each movement.
    - Have students determine the probability that they will use each of the movements in their choreography.
    - Have students roll their dice to determine what each movement in their choreography will be.
- Students will then create choreography for the data they have.
- Each group will share their choreography with the whole class.

Closing/Reflection

- Facilitate a discussion around the following questions:
    - How was each group's dance different even though each group had the same data to start with?
    - How did probability impact the outcome?

ASSESSMENTS

Formative

- The teacher will assess student learning throughout the lesson by observing students' ability to use various movements in dance and their ability to use chance to create a unique piece of choreography.

Summative

- Create a list of questions to ask about the students' choreography/data. Examples:
    - What is the probability that your dance has:
        - One turn
        - Two jumps
        - One slide and one clap
- Compare all groups' choreography–Example: What is the probability that all groups had a jump first?

DIFFERENTIATION

Accelerated: Students will compare statistical data and probability of all the groups.

Remedial:

- Limit the data set.
- Limit the complexity of mathematical questions about the data.

ADDITIONAL RESOURCES

- Dancing statistics: explaining the statistical concept of correlation through dance
- Dancing statistics: explaining the statistical concept of frequency distributions through dance
- Dancing statistics: explaining the statistical concept of variance through dance
- Dancing statistics: explaining the statistical concept of sampling & standard error through dance

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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