

Study Guide for Teachers

“LOCO * MOTION”

Adam Battlestein and Friends



Young
Audiences
Arts for
Learning

Connecticut

ABOUT THE PROGRAM

Loco * Motion is a one hour lecture demonstration which teaches science using dance. There are four complete dances with an introduction to the concepts they illustrate before each dance and a period of question and answer afterwards. In the program we cover concepts such as Friction, Buoyancy, Balance and the Inner Ear as well as how and why Gyroscopes work. We touch on other concepts such as Draughting, Newton's 1st and 3rd laws and the Bernoulli principle for older students. The visual and kinetic demonstration of these principles using dance entertains, educates, and excites students about both science and dance. Students are asked to make hypotheses, to engage in thought experiments as well as to join us on-stage to participate in some of our demonstrations.

VOCABULARY and TERMS

Bernoulli's Principle Fast moving fluid exerts less pressure than the surrounding fluid.

Friction: The phenomenon which causes heat and resistance when two surfaces rub against each other

Gyroscope: A device consisting of a spinning mass, typically a disk or wheel, mounted so that its axis can turn freely in one or more directions.

Hypothesis: A statement which predicts the results of an experiment.

Motion: The state in which one object's distance from another is changing.

Sterocilia: Tiny hairs inside the inner ear which sense movement of fluid and send information to the auditory nerve.



OBJECTIVES

- To demonstrate an understanding of the scientific concepts covered in the presentation.
- To generate hypotheses and feel that they could design simple experiments to test them.
- To generate excitement for science and dance and inspiration to explore them both further.



BEFORE THE PROGRAM

Questions:

What is friction and why is it important?
What is rolling friction?
What kind of friction do air planes experience?
What makes something float?
What is a gyroscope?
How do we balance? How do dancers' and gymnasts get such good balance?

AFTER THE PROGRAM

Questions:

Why can't you push a top over easily while it is spinning?
What makes a Frisbee stay flat while it flies?
The gyroscopic principle states that an object that is spinning resists a change of axis.
This sometimes looks like an anti gravity effect as in the "floating" bicycle wheel. What is actually behind this effect? Gravity!

CURRICULAR LINKS

Connecticut State Department of Education

Source: The CT Framework - K-12 Curricular Goals and Standards

- ✚ Goal 1: Nature of Science
Students will conduct scientific investigations which generally involve the collection of relevant evidence, the use of logical reasoning and creativity in devising hypotheses and explanations to make sense of the evidence.

Source: The CT Framework – Dance

- ✚ Standard 2: Choreography
Students will demonstrate the following partner skills: creating contrasting and complementary shapes, taking and supporting weight, balance and counter balance.
- ✚ Standard 4: Thinking Skills
Students will explore, discover and realize multiple solutions to a given movement problem, choose their favorite solution and discuss the reasons for their choice.

RESOURCES

<http://science.howstuffworks.com/gyroscope4.htm>

SCIENCE EXPLORER: Motion, Forces, Energy
(published by Prentice Hall)

ABOUT THE ARTIST

Adam Battelstein has been teaching for Pilobolus around the country and internationally for many years as their master teaching artist. He also serves as a master teaching artist for the state of Connecticut's Commission on Culture and Tourism.



WORKSHOP

25 students, 50 minutes and a microphone with space to move about freely are the requirements for a workshop based on Loco*motion.

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