

# Greg Kennedy

## *Innovative Juggler* — Teacher's Study Guide

### About the Performer

To change people's ideas about juggling, Greg Kennedy fuses logic and creativity to synthesize new forms of object manipulation. Greg spent several years working as a professional engineer, in addition to his juggling career. His fascination with geometry and physics led him to create ground-breaking work with original apparatus, expanding the realm of juggling. "He is a visionary who can see the possibilities in props and movement that are obscure to the masses," writes Bill Giduz, *Jugglers World* magazine.

Twice, Greg has entered the highest-level juggling competition, the International Jugglers Association Championships. On both occasions he received their highest honor, the Gold Medal. As one of the first jugglers to go viral, he received over 2-million views on YouTube. He was the original 'Scientist' character in Cirque Du Soleil's *TOTEM*, touring with them for five years. Throughout his performance career he has shared his art with millions of people in over 50 different countries.

### THEMES:

- ACCELERATION
- ANGLE OF REBOUND
- BALANCE
- CENTRIPEDAL
- ELLIPTICAL MOVEMENT
- FRICTION
- GYROSCOPIC STABILITY
- GRAVITY
- INERTIA
- LIGHT REFRACTION
- LOGIC
- MATHEMATICS
- NATURE
- OPTICAL ILLUSION
- PENDULUM MOVEMENT
- PHENOMENA
- PHYSICS
- SCIENCE
- SPECTRAL DISPERSION
- VELOCITY

### About the Performance

Can anything be fun about the study of physics? Will we ever use these things in our real lives? If you are juggler Greg Kennedy, the answer to both questions is: absolutely yes! *Innovative Juggler* is a combination of high-energy juggling, clean comedy and unique performance pieces. Trained as an engineer, Greg Kennedy uses the principles of geometry and physics to create ground-breaking work with original apparatus.

Greg honed his skills performing for five years with *Cirque du Soleil* in 25 cities for more than 3 million people. He won the Gold Medal at the International Jugglers' Association Championships, appeared on the *Tonight Show* and has received over two million views on YouTube. His brilliant blend of impressive feats, rapid-paced wit and the pure beauty of motion amazes audiences everywhere.

## Pre-Show Activities

### ***Skill Survey (15 minutes) [K-7]***

Suggest to the class that although juggling is a specialized skill, it is like any other skill in that it takes practice to become good at it! On the board set up a pictograph or a bar graph with four to ten sections. With the class choose four to ten different skills to survey the class about (e.g. juggling, tying shoes, dribbling a basketball, setting the table, multiplying by nine, playing a recorder, etc.). Then as you progress through each skill, have students raise their hands if they feel they have mastered that skill, noting the results on the board. As an extension, ask students to represent the results you've collected as a class independently with a different type of chart/graph.

### ***Race to the Bottom (20 minutes) [K-4]***

Present a collection of similarly sized objects with a variety of textures for students to observe. Ask them to share what they notice as they look at and touch the objects. At the front of the class choose a few pairs of objects and drop them from the same height at the same time in view of the students. Record which objects drop quickly or slowly on the board. Discuss with students possible reasons for the differing speeds. Introduce the concept that objects fall differently because of their shape due to air resistance. Invite students to observe the shapes and textures of the objects being used in the upcoming show.

### ***Balancing Act (15 minutes) [4-7]***

Write "Balanced Forces" and "Unbalanced Forces" on the board and describe each (*Note: balanced forces are equal and opposite forces such as sitting in a chair; unbalanced forces are unequal forces where one force is larger, such as a rocket taking off*). With the help of the class, list examples from daily life of each. Pick some examples from the board and draw diagrams of them, including labelled arrows for the forces (e.g. gravity, air resistance or drag, tension, elasticity, the force of a hand pushing upwards, etc.).

## Post-Show Activities

### ***Three Ball Cascade (30 minutes) [K-7]***

Juggling moves are essentially repeating patterns. The basic juggling pattern of the three ball cascade can be represented in physical form by the three-strand braid (or basic braid). To demonstrate, hang three different coloured ropes from a single point at the front of the class. At the bottom of each rope tie a knot to represent a ball. Starting with two ropes in your left hand and one rope in your right demonstrate a three-strand braid, emphasizing that the resulting braid is a visual representation of the path that the balls are taking between two hands. Undo the braid and demonstrate again, this time emphasizing how after three passes of the ropes the rope you started with in your left hand is now in your right hand. This is the result of three balls/ropes being passed over two hands (a pattern of 3 over 2). Distribute three coloured pieces of yarn to each student, with tape to fix one end to a surface, so they can try the braid themselves. Ask the students to visually represent on a piece of paper this pattern, using any method they choose (numbers, colours, graphs, drawings, etc.). As an extension, have students choose a math manipulative to find yet a different way to represent this pattern.

### ***Balancing Act II (15 minutes) [4-7]***

Thinking back on the performance and your earlier class discussion of balanced and unbalanced forces, list examples of each from the show on the board (e.g. balanced forces might include stacking of objects, unbalanced forces might include tossing a prop). Ask students to pick their favourite part of the show and to diagram it themselves, labelling it as balanced or unbalanced and drawing arrows with the different forces at play. Invite students to share with the group and then offer students an opportunity to modify their diagrams if needed.



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