

FirstWorks Virtual Learning Series: eVenti Verticali & *Quadro*, a Suspended Wall

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eVenti Verticali is a cultural sports association based in Italy that aims to promote an unusual type of theatre to be performed on vertical and aerial stages. Founded in 2006 from an idea by Andrea and Luca Piallini, eVenti Verticali promotes the Vertical Theater as an original, distinctive and multidisciplinary language and has created courses and shows around the world. Born from a dream of dancing on a flying wall, *Quadro* is an aerial stage of 50 square meters (approximately 164 feet) covered in white fabric with four large holes. It appears to the public as a horizontal plane that slowly moves and turns into a wall. Four dancers move on the white stage like pencils on an empty sheet, like colors on a dull canvas ready to paint acrobatic leaps and flights suspended in mid-air. In a slow game of changes in perception, perspectives are blurred: the horizontal and vertical planes intertwine in a sort of perspective illusion that confuses the viewer's gaze.



About Vertical Theater

Vertical Theater stems from vertical dancing. The idea of working on vertical surfaces came up in 2003, while Andrea and Luca were performing a rope descent from a window during a show in Gdansk, Poland. Vertical spaces become floors on which the performers, supported by harnesses and suspended on ropes, dance, jump, run, and perform using the walls as orthogonal working surfaces. eVenti Verticali sees Vertical Theatre as a language that brings together different art forms, starting from theatre and circus, graphics, acrobatics, dance and music, to visual comedy and new technologies. All of these different disciplines get reinvented and adapted to unusual and impressive vertical locations: towers, buildings façades, bell towers, walls, cliffs, trees and the great outdoors.

About The Video

The accompanying video includes excerpts from the United States premiere of *Quadro* by eVenti Verticali presented by FirstWorks on June 7 and 8 at PVDfest 2019. [Watch the video here.](#)

Physics, English Language Arts (ELA), and Dance Lessons: Grades 4-12

Physics: HS-PS2-1 PS2.A - Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS3-5 PS3.C - Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

English Language Arts (ELA): CCSS.ELA-LITERACY.RI.7-12.4 - Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

Dance: DA:Pr4.1.6c - Use the internal body force created by varying tensions within one's musculature for movement initiation and dynamic expression. Distinguish between bound and freeflowing movements and appropriately apply them to technique exercises and dance phrases.

DA:Pr5.1.7a - Apply body-use strategies to accommodate physical maturational development to technical dance skills (for example, functional alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement, weight shifts, flexibility/range of motion).

DA:Pr5.1.8a - Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to replicate, recall, and execute spatial designs and musical or rhythmical dance phrases.

DA:Pr5.1.1a - Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to retain and execute dance choreography.

DA:Pr4.1.1a - Develop partner and ensemble skills that enable contrasting level changes through lifts, balances, or other means while maintaining a sense of spatial design and relationship. Use space intentionally during phrases and through transitions between phrases. Establish and break relationships with others as appropriate to the choreography.

DA:Pr5.1.4a - Demonstrate fundamental dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness) and movement qualities when replicating and recalling patterns and sequences of locomotor and non-locomotor movements.

DA:Pr5.1.5a - Recall and execute a series of dance phrases using fundamental dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement).

DA:Pr5.1.6a - . Embody technical dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement) to accurately execute changes of direction, levels, facings, pathways, elevations and landings, extensions of limbs, and movement transitions.

DA:Pr5.1.7a - . Apply body-use strategies to accommodate physical maturational development to technical dance skills (for example, functional alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement, weight shifts, flexibility/range of motion).

DA:Pr5.1.8a - Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to replicate, recall, and execute spatial designs and musical or rhythmical dance phrases.

DA:Pr5.1.1a - Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to retain and execute dance choreography.

RECOGNIZING FORCES: Isaac Newton's Laws of Force and Motion

Newton's First Law: An object that is sitting at rest will stay at rest, and an object that is in motion will stay in motion until a force acts upon it.

Newton's Second Law: $F = ma$ (Force acting on an object = the mass of the object x the object's acceleration.) The greater the force the greater the acceleration. The greater the mass, the greater the force needed to move the object.

Newton's Third Law: For every action there is an equal and opposite reaction. Forces are always found in pairs. If the forces are equal in opposite directions, the object will not move. The forces cancel each other out so that the acceleration is zero.

In non-mathematical terms, the normal force is what keeps us from sinking into the ground: we experience the force of gravity and yet we aren't sucked into the Earth's crust. Why? Because the object we stand upon provides an equal but opposite force on our feet. This principle still applies to objects on an inclined plane. As the angle of the plane increases, the force of gravity is divided. Gravity causes the object to travel downward and horizontally along the plane's surface. The normal force must still counteract the downward portion of gravity, but will be less than the total gravitational force since the object is sliding horizontally. This requires us to use the cosine term to reduce the total normal force. Eventually, if the angle of incline increases enough, we would be taking $\cos(90^\circ)$, which is zero; if the object is in free fall (the plane is vertical), then there is no normal force.

Example of Newton's 3rd Law in the accompanying video: Two dancers push against each other. The first dancer on the left exerts a normal force on the second dancer directed towards the right, and the second dancer exerts a normal force on the first dancer directed towards the left. The magnitudes of both forces are equal, but they have opposite directions, as dictated by Newton's third law.

I. Watch the accompanying video of *Quadro* by eVenti Verticali. Determine if the following scenarios do, or do not, contain forces. Explain your conclusions. Then, choose two scenarios to replicate using objects. Videotape each scenario you choose. How does it compare to the professional dancers in the video? ***DO NOT TRY THESE MOVEMENTS YOURSELF***:

1. The flying wall is at rest while suspended from the crane. Consider the forces acting on the wall.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____

2. The crane has just come to rest after lifting the flying wall up. Consider the forces acting on the wall.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____

3. Notice that two of the dancers sit in hoops within their circular openings at the bottom of the flying wall. Consider the force acting on the hoop while it is at rest and the flying wall is being lifted in the air.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____



4. Notice the two dancers in harnesses within their circular openings at the top of the flying wall. Consider the force acting on the harnesses as they turn somersaults in the air.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____

5. Notice when the dancers push off from the flying wall. They do not fall because they are wearing harnesses. Consider the forces acting on them as they fly through the air.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____

6. Notice when the dancers all join hands and feet, somewhat mimicking the shape and depth of the flying wall. Consider the forces acting on them when the wall is still.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____

7. Dancers run across the flying wall. Consider the forces acting upon them as this takes place.

- a. Gravity: Present Absent Explain: _____
- b. Spring: Present Absent Explain: _____
- c. Tension: Present Absent Explain: _____
- d. Normal: Present Absent Explain: _____
- e. Friction: Present Absent Explain: _____
- f. Air Resistance: Present Absent Explain: _____

II. GRAVITY Exercise: Set a timer for 1 minute. Starting the timer, begin to slowly make your way to the floor, feeling the weight of all your limbs as you curl downward. Try to move at a constant rate, keeping track of how heavy each of your body parts feel and how that changes as you move closer to the floor. See if you can take the full minute to go from standing to lying down, arriving with your back on the floor just as the timer sounds. Lie down on the floor with your legs and arms extended straight. As your body presses down, the floor pushes up. Feel the weight of your body as you lie still.

Restart the timer, and this time take 1 full minute to slowly move from lying on your back to standing up straight, again moving at a constant rate. Paying attention to each muscle you engage to help you move to standing, and if your experience of how heavy your body is changes as you move. Try to arrive at stillness standing on two feet just as the timer sounds. Once standing, feel the difference in the weight of your arms, your head, your pelvis. Which part of you feels the pull of gravity the most strongly while you are standing?

Try the exercise two more times, this time setting the timer for 30 seconds, and then for 10 seconds. How does your experience of the weight of your body change as you move more down to and up from the floor? How does the feeling of gravity pulling your body parts change as you move?

Extra credit: try setting the timer for 5 minutes. As you maintain a constant rate of motion from standing to lying down, how does your experience of weight differ from your previous tries? Do you feel the pull of gravity more, or less? Do certain body parts feel the pull more, or less?

III. BALANCE Exercise: Stand with your feet flat on the ground spaced shoulder-width apart, with a long straight spine. Gently turn your head from left to right and right to left to relax your muscles. Close your eyes. Keeping your feet flat on the floor, shift your weight slowly to your right foot, and then back to the center. Then shift your weight to your left foot, and then back to center. Move your weight forward into the balls of your feet as far as you can, feeling the pull of gravity change as you shift the distribution of your weight. Do not bend your waist. Return to center, and try again with moving your weight back into your heels as far as you can, and then back to center. As you move, your muscles recalibrate to keep you from falling. The pressure in your feet changes as you redistribute your weight. The gravitational pull on your body becomes noticeable as you lean in different directions.

Try this exercise again, but this time lean past the point where you can remain upright. As you begin to fall to the side, slide your leg out and catch yourself in a lunge before you fall completely. Then, push into the lunging leg with just enough force to propel you back to standing upright, both feet flat on the floor. Repeat this lean-fall-lunge pattern to the front, left, back, and right. You can use your arms to help. Try this with your eyes open at first, then try closing them. Can you identify your tipping point, when you lean so far that you are no longer balanced, and gravity pulls you into motion? How much effort does it take to push against gravity to move from your lunge back to standing?

IV. COMPOSITION Exercise: The dancers in the accompanying video of *Quadro* by eVenti Verticali build their movement in relation to large objects, using the flying wall, hoops, and other equipment not as props, but as dancing partners. For this composition exercise, identify two or three objects to use as “dancing partners” – consider sturdy furniture, like a sofa or bed, or else small soft objects like pillows.

After choosing your “dancing partners,” do a close-watch of the *Quadro* video, looking for examples of when the dancers’ equipment is integral to their movement. On your own, make up a 10-second sequence of movement that relies on the objects you’ve chosen, using the eVenti video for inspiration. You can pick music to play while you work to help you create movement if you like. Once you have finished, video tape your composition, and write a short paragraph explaining the moments where you used your objects like dancing partners.

Next, practice the exact same 10-second sequence of movement you created with one difference: remove the objects. How must you modify your movement now that you cannot rely on your dancing partners? Try to keep the same energy and spirit of your movements as you revise your sequence to be possible without props. Record your final product, and write a short response about what you needed to change in your dance. How did you approach the problem? What was the most difficult part of your dance to do without an object, and why?

Note for educators: This exercise can also be done in the reverse. Students can make a 10-second phrase of movement first and record it, using eVenti Verticali's performance as movement inspiration. The written response can be about which elements of movement they chose to emulate and why. Then, students can remake their phrase but adding in the objects. The written response can discuss how students adapted their original phrase to incorporate their dancing partners and how they approached the problem. They can consult the eVenti Verticali video for ideas of how to modify their movement to incorporate props.

Note to Educators:

FirstWorks Education will make every effort to connect appropriate supporting curricula to the arts presentations provided. However, your professional expertise, rapport with your students, and knowledge of their capabilities will make these lessons resonate. We welcome your feedback: Did you use the lessons? How did it go? Did you not use them? If not, why? Or, did you vary them? Please let us know. We are here to help. We'd also be delighted to see any resulting creations!

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