

Program Name: Construction Physics

Artist: Paige Ahlenius

## Special Requirements:

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A large empty area, classroom chairs, projector for PowerPoint (optional), and large books and plastic bins or cardboard boxes (optional). Teachers must be present at all times during workshops.

## Workshop Description

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This hands-on workshop is an excellent opportunity for students to explore physics and learn by experimentation the definition of velocity, friction, gravitational pull and push, energy, etc. Students will actively participate in a challenge to build and test a structure and learn to appreciate

the importance of trial and error and imagination for engineers. Educators can choose from one of the following challenges: roller coasters, paper bridges, skyscrapers, or balloon rockets. This group activity requires careful listening and respect for other ideas, a great team building opportunity!



## Educational Objectives & Standards

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Students will:

- Work in groups to design and build structures.
- Learn trial and error and learn from their mistakes.
- Learn basic engineering principals.

Standards addressed:

- Engage in active listening.
- The position and motion of an object can be changed by pushing or pulling.
- Things move in different ways (straight line, zigzag, vibration, circular motion).

## Artist Bio: Paige Ahlenius

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Paige Ahlenius has been teaching in Kansas City since 1999. She started out as a scenic designer and has a Masters of Fine Arts in Scene Design from the University of Virginia.

She has developed various process-based art, social studies and science programs such as

PLAYGROUND ART,  
CONSTRUCTION PHYSICS AND  
GALIMOTOS for children ages 3-12.

She also teaches scene painting at the Community School of the Arts. She has worked for Kansas City Young Audiences since 2008.

## Vocabulary

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**Physics:** the study of how things work.

**Aesthetics:** beautiful; pleasing in appearance.

**Construction:** the building of something, especially a large structure such as a house, road, or bridge; the way in which something has been built, especially with regard to the type and quality of the structure, materials, and workmanship.

**Experiment:** an attempt to do something new or see what will happen: use of repeated tests and trials: the use of tests and trials in order to make discoveries.

## Workshop Choices

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**Rollercoasters:** by hands on trial and error, the students will learn the principals of velocity, friction, kinetic energy, gravity, potential energy and rate of speed. Concepts: loops, corkscrews, struts and rails.

**Paper Bridges:** Students will learn to construct a bridge to support different weights over a 3" span. Concepts: gravitational force, counter weights and suspension.

**Skyscrapers:** The students will learn the basics of building and designing skyscrapers. They will explore the impact that tornadoes and earthquakes can have. Concepts: Balance, weight, counterweight, suspension and support.

**Balloon Blast:** Students work as a team to build a simple machine to accomplish hitting a target across an 8ft span. Concepts: Acceleration, Mass, Velocity and Action Force.



## Post-Workshop Activities

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1. Make a parachute! Grab a plastic bag and cut out an octagon. Cut a small whole near the edge of each side. Attach 8 pieces of string of the same length to each of the holes. Tie the pieces of string to an object that could be used as a weight. Stand on a chair to drop your parachute and test how well it worked (it should fall slowly).

2. Use the following web resources for follow up activities that explore engineering and physics concepts.

- [pbskids.org/designsquad/parentseducators/](http://pbskids.org/designsquad/parentseducators/)
- [www.teachengineering.org/](http://www.teachengineering.org/)
- [Childrensengineering.org](http://Childrensengineering.org)

Contact KCYA for more information about this and other programs

816.531.4022  
KCYA.org