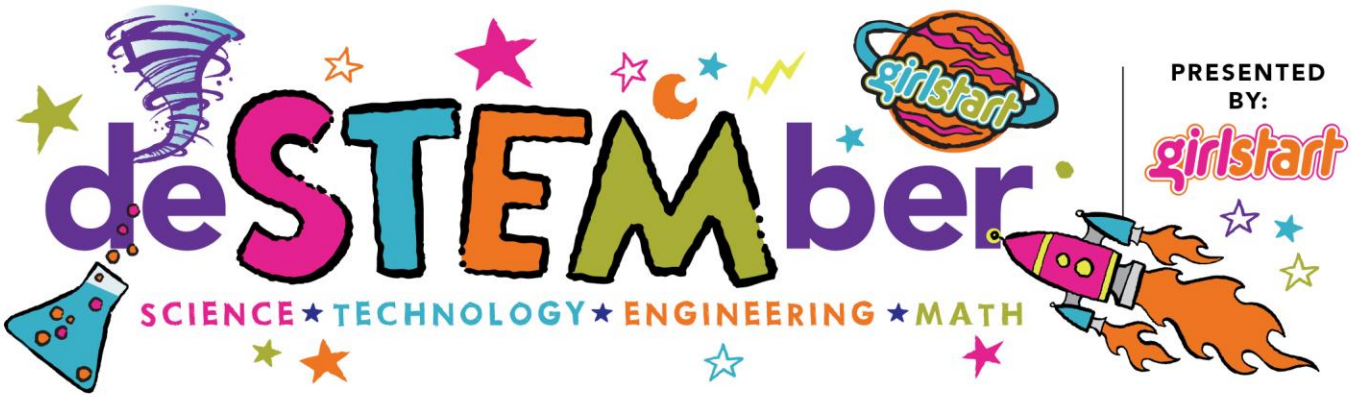


Human Slingshot

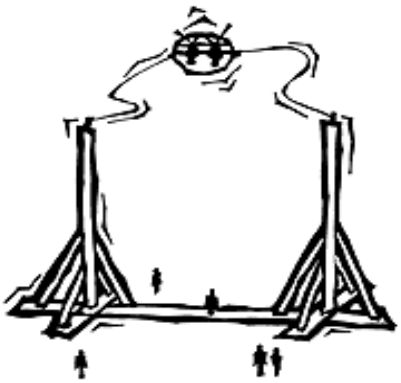
Have you ever gone to an amusement park and wanted to experience the slingshot cage ride? The cage is stretched to the ground for passengers to be harnessed in; then the tension is released and the cage goes flying. Explore how potential and kinetic energy make this exhilarating and terrifying ride possible as you create your own human slingshot prototype!

TEKS:

6.8A: Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy. The student is expected to compare and contrast potential and kinetic energy.
6.9C: Force, motion, and energy. The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed; it just changes form. The student is expected to demonstrate energy transformations, such as how energy in a flashlight battery changes from chemical energy to electrical energy to light energy.

Materials:

- 1 12” elastic cord
- Masking tape
- 5 paint stirrers
- 4 paperclips
- 4 rubber bands (all sizes)
- 1 small whiffle ball
- Tacky glue
- 8 tongue depressors



http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/newton/slshot.gif

How To:

1. If you were to design a human slingshot ride for an amusement park, what would it look like? Dream up a design, and then create a model of it using the materials above.
2. Make sure that your design includes a place for riders to sit. (In the model you build, the whiffle ball is meant to be seats for the riders.) Use the paint stirrers, tongue depressors, rubber bands, bungees, paperclips, tape, and glue to build a model of your design. Remember, you have limited materials so use them wisely. A big part of designing is making sure that you don't plan to use more materials than you actually have.
3. This is YOUR design. You can create it any way you would like. When you are finished making your slingshot ride, try it out!

STEM Explanation:

How do slingshots work? Have you ever launched a rubber band across the room using your fingers? When you pull back on something elastic (like a rubber band), you input potential energy into the system. Potential energy is the energy an object can store based on its position. The farther back the rubber band is pulled (the more it stretches), the more potential energy it has. When you let go, the potential energy is converted into kinetic energy, and the rubber band launches across the room! Kinetic energy is the energy of motion. The heavier an object is and the faster it moves, the greater the kinetic energy that it has. These ideas about potential and kinetic energy apply to human slingshot rides, just like your prototype, but on a larger scale.

Career Connection:

Amusement park ride engineers are creative, innovative, and have a strong understanding of math and civil engineering. They design new attractions on the computer with their knowledge of physics, collaborate with other engineers to create the ride using proper materials, and decide how to efficiently maintain it. They often work closely with park owners and a construction team to ensure the ride meets all the required standards and to solve any problems that arise during building.

Resource:

http://www.4science.org.uk/assets/files/pdf/engineering/thrills_P_Activity_3.pdf