

## Inquiry Question

**Can knowledge of Newton's Laws help you win "Jenga"? Let's build a game of "Physics Jenga" and observe Newton's Laws in action**

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Isaac Newton was a brilliant scientist in the 17<sup>th</sup> and 18<sup>th</sup> century. His laws of physics are still relevant today. Let's look at the three foundational laws by playing a game of "Physics Jenga".



### General Instructions

In this experiment, the student will be building towers out of solo cups and blocks as shown below.

#### Materials you'll need:

- Your course notes
- The internet
- around 20 solo cups per team
- 15 or so cards with string
- tape for over the string hole (so the cards do not rip)

#### Procedure:

- Build the Solo Cup "Jenga" Towers as shown below. Be sure to place a card with attached string (as shown) between each cup.



- Play the game by trying to remove all the cards without toppling the tower.
- In the case of the Solo Cup tower, they are to remove cards so that the cups stack into each other.
- After each game discuss the best techniques and choice of cards based on Newton's Laws.
- After they discuss, mix up the teams and play again.

**Ideas and Hints**

- try a tower of seven layers each with one Solo Cup to start. Then try a tower with each layer consisting of two solo cups stacked tightly together.
- Pay attention to how you must pull at the top of the tower compared to the bottom.
- Try pulling from top down, then repeat from bottom up. Discuss.

**Project submission:**

- Write up a set of tips and pointers to "win" at this game. Make your instructions in terms of Newton's Laws. Diagrams, photos, or videos of your techniques are encouraged. If you can drop-in to the school, you can present it to your teacher in-person. Otherwise, upload it to the project submission folder at the end of the unit.

**Project Timing:**

- In its most basic form, this project will take the average student 2 hours. Locating all of the materials needed may vary.

**Inquiry Questions and Experimental Design:**

1. Is it better to pull the cards quickly or slowly? Which of Newton's Laws represents this?
2. Is it better to pull from the bottom or the top first? Which Law?
3. Should the cards be pulled out straight (horizontal), up at an angle, or down at an angle? Why?
4. Was the game made more or less difficult when the cups were stacked two at a time (doubling the mass)?