



Newton's Third Law e-Lab Balloon Experiment

During the actual e-Lab, students will conduct an experiment following the directions of the lab director. Please have all materials ready to distribute to each group prior to the beginning of the e-Lab. This will provide more time for conducting the experiment.

Setting up the experiment:

- Prior to the e-Lab, assign groups an area to conduct their experiment. This will be based on the specific question they are solving. (See individual team materials and description)
- Have materials ready to distribute to each group when lab director instructs them to begin setting up the lab.
- During the lab, students will tape one end of the string to a wall (or doorway). They will then slide a straw onto the other end of the string, and then attach the other end of the string to a wall.
- The lab director will instruct them to roll a piece of tape and stick it to the straw. They can then blow up their balloon and investigate the two variables assigned to them (height, mass, etc.)

Materials for Team Alpha:

- **Variables to Test:** balloon on top of straw vs. balloon underneath straw
- 2 balloons (and probably a few extras in case they pop or tear)
- 2 straws
- String
- Tape
- Access to two walls (or stationary objects)
- Stopwatch

Materials for Team Bravo:

- **Variables to Test:** moving vertically from up to down vs. down to up
- 2 balloons (and probably a few extras in case they pop or tear)
- 2 straws
- String
- Tape
- Access to doorway (to test vertically)
- Stopwatch

Materials for Team Charlie:

- **Variables to Test:** high to low vs. low to high
- 2 balloons (and probably a few extras in case they pop or tear)
- 2 straws

- String
- Tape
- Access to 2 walls (or stationary objects)
- Stopwatch

Materials for Team Delta:

- **Variables to Test:** more mass vs. less mass
- 2 balloons (and probably a few extras in case they pop or tear)
- 2 straws
- String
- Tape

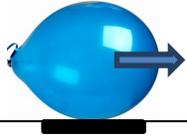
- Paperclips, pennies, washers, or other small object to make one balloon more massive than the other. It will need to be small enough to put inside the balloon.
- Access to 2 walls(or stationary objects)
- Stopwatch

Materials for Team Echo:

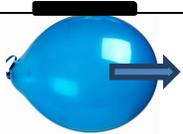
- **Variables to Test:** more air vs. less air
- 2 balloons (and probably a few extras in case they pop or tear)
- 2 straws

- String
- Tape
- Access to 2 walls(or stationary objects)
- Stopwatch

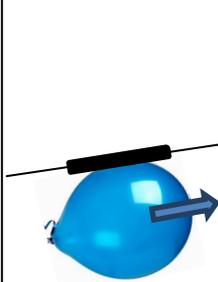
TEAM ALPHA: Balloon on top of straw vs. balloon underneath straw



VS.



TEAM CHARLIE: Horizontally low to high vs. high to low



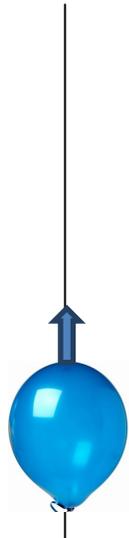
VS.



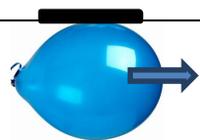
TEAM BRAVO: Vertically going up to down vs. down to up



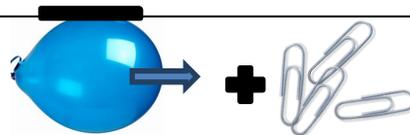
VS.



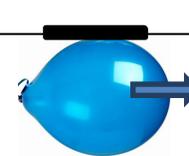
TEAM DELTA: Less mass vs. More mass



VS.



TEAM ECHO: Less air vs. More air



VS.

