

## Research Procedures

### Air Cushion Protection System

---

*Follow these instructions to research the amount of inflation you need for your air cushion protection system.*

- 1. Design 2 air cushions.** One air cushion should be overinflated. The other should be underinflated.
- 2. Use exactly 100 mL of acetic acid (*vinegar*) for each test.** One member from each team will measure exactly 100 ml of vinegar into the team's zip-seal bag and bring this back to the table.
- 3. Measure the amount of sodium bicarbonate (*baking soda*) needed for the underinflated air cushion.** How much sodium bicarbonate will your team need to be sure that the bag is inflated, but a minimal amount? A team member will measure out the grams of sodium bicarbonate the team decided on into the team's portion cup.

Mix the 2 chemicals in the zip-seal bag. Be sure you flatten the bag and zip it tightly before the chemicals come in contact with one another.

When you have an underinflated bag, record the number of grams you used on the data sheet you made.

Measure the circumference of the inflated air cushion and record that information on the data sheet.

- 4. Follow the same procedure to create an overinflated air cushion.** Wash out the bag and dry it well. Then, follow the same procedure. In the event that this air cushion does not inflate enough, you may run this test again time, using more sodium bicarbonate, until you get a large inflated bag.

**Following each test, record your results data on the *Data Collection Sheet*.**

- 5. Graph your data points and construct a line graph.** Get a sheet of graph paper. When you finish your testing, look at your data sheet and plot your results on the graph paper. Plot the circumference in centimeters on the y axis, and the amount of sodium bicarbonate in grams on the x axis. Draw a "best fit" line between the points.

