

Aerodynamic Shape Investigation #1

Objective

To understand how the shape of an object affects the amount of aerodynamic drag it will encounter.

Materials Needed

- Soda can (empty)
- Sheet of paper
- Tape
- Two 1/2" diameter wooden dowels (three feet long)

Procedure

1. Explain to students that aerodynamic drag can be demonstrated with an ordinary soda can. Since the soda can is lightweight and will slide easily on many hard surfaces, the friction forces on it will be low enough that we look at variations in the resistance from aerodynamic drag.
2. Have students set up dowels as shown in the figure below and place the soda can on them at one end.
3. Blow on the can and observe its movements and the strength of the blow.
4. Make a cone out of the paper and tape it to the front of the can so it resembles a rocket with a pointed nose cone. Place the can on the dowels with the cone facing the direction in which the can will be moving.
5. Blow on the can and observe its movements and the strength of the blow.
6. Conclude with a discussion based on these questions:
 - How does the cone end can compare with the flat end can?
 - The frontal area (area projected to the front or direction of the air movement) did not change when the cone was applied, so what affected the amount of force applied to the can?
 - What kind of resistance forces would this can feel if it were a moving vehicle?
 - How can you apply these principles to your car to make it faster?

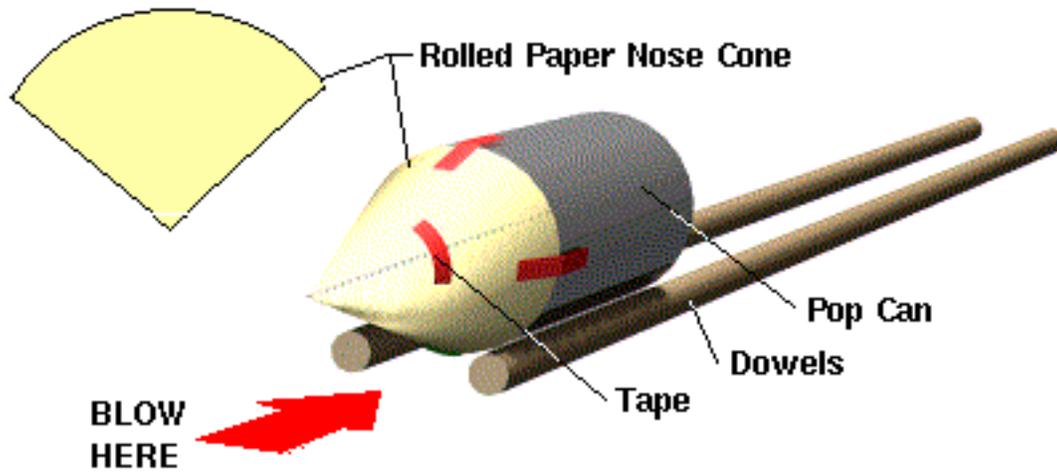


Figure 7: Aerodynamic shape investigation setup

Sources: Adapted from *Junior Solar Sprint: Classroom Investigations*, by Andrew Heafitz for NREL, 2001; and materials created by Rick Butchart for the Chimacum School District in Washington; used with permission.