



PROJECT: Aerodynamics & Wind Tunnels

BACKGROUND INFORMATION

As a car moves along, it pushes the air that surrounds it away. As a result the car is subjected to drag. Drag, also known as air resistance or fluid resistance refers to forces that oppose the motion of the vehicle. About 60% of the power required to cruise at highway speeds is taken up overcoming air drag, and this increases very quickly at high speed. Vehicle are said to be more aerodynamic if by their exterior design they can reduce the drag that the car experiences. By being more aerodynamic the car engine doesn't need to work as hard, and hence the car can use less fuel and become more fuel efficient.

To measure the aerodynamic effectiveness of a car, engineers use a tool from the aircraft industry called a wind tunnel. Basically a wind tunnel is a massive tube with fans that produce airflow over an object inside. (Refer to the image below). Because air is transparent it is difficult to directly observe the air movement itself. Instead, smoke or a fine mist of liquid is sprayed into the tunnel just ahead of the device being tested. From a room behind the tunnel, engineers study the way the air currents flows over the car.



TASK:

The outside shape and design of a car affects how much drag it experiences.

Objects that are shaped to produce the smallest amount of drag are called streamlined or aerodynamic. Your task is to design a car which is aerodynamic. In order to do this however you will need to investigate which shapes are best at reducing drag. Have a look at Nathaniel's home made wind tunnel <http://pbskids.org/dragonflytv/show/windtunnel.html>. Your task will be to build a wind tunnel like Nathaniel's (or better) and test different Styrofoam carved cars, to see which shape is most aerodynamic.