Name _____

Period _____

Airplane Unit (100 Points)

The purpose of this unit is to give students a chance to design an airplane of their choice. Students will be given materials consisting of foam, balsa wood, drywall screws, and rubber bands. They must design an aircraft that will fly smoothly and land gently when propelled by an air powered launch ramp.

Time given to complete: Students will be given four days in which to complete the design of their aircraft. Each student will be given their own set of materials and will be required to complete their plane in the time allotted.

The only materials that can be used to build the aircraft will be the Styrofoam block, Styrofoam wing, balsa wood, rubber bands, hot melt glue, and drywall screws provided by the instructor. There will be two different styles of wing material that you may use. You will be allowed to shape your aircraft in anyway that you would like but the aircraft must have a hole large enough and in a position that the launch hose can be inserted into your design. A burst of air will propel your aircraft off of the ramp and your plane must fly and land smoothly once it leaves the ramp. Your challenge is to create a design that gives the greatest distance out of your plane.

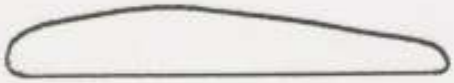
Students will need to design an aircraft that will fly off of the launch ramp with only the power given by the air pressure from the air hose. Students will be given 3 chances to get their best flight distance. The student in each class that flies the greatest distance will win two free tickets to the movies.

Replacement Part Costs:

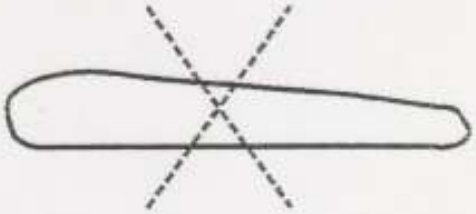
- Foam Body…….$0.50
- Foam Wing…….$0.50
- Balsa Wood……$1.00
- Rubber bands will be given out only for construction of the airplane as long as they are not misused!
- Drywall screws will be used to balance the plane for proper flight. Students will be able to use a maximum of 15 drywall screws to balance their aircraft.

PROPER AIRFOIL SHAPE

CRITICAL INFORMATION – FOR A GOOD FLIGHT PATTERN

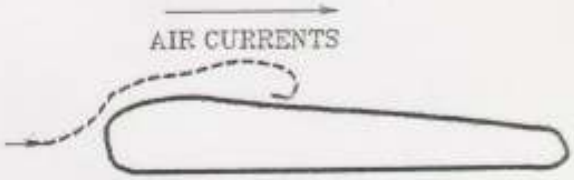


This airfoil shape is **correct.** This is the shape of a real airplane wing.



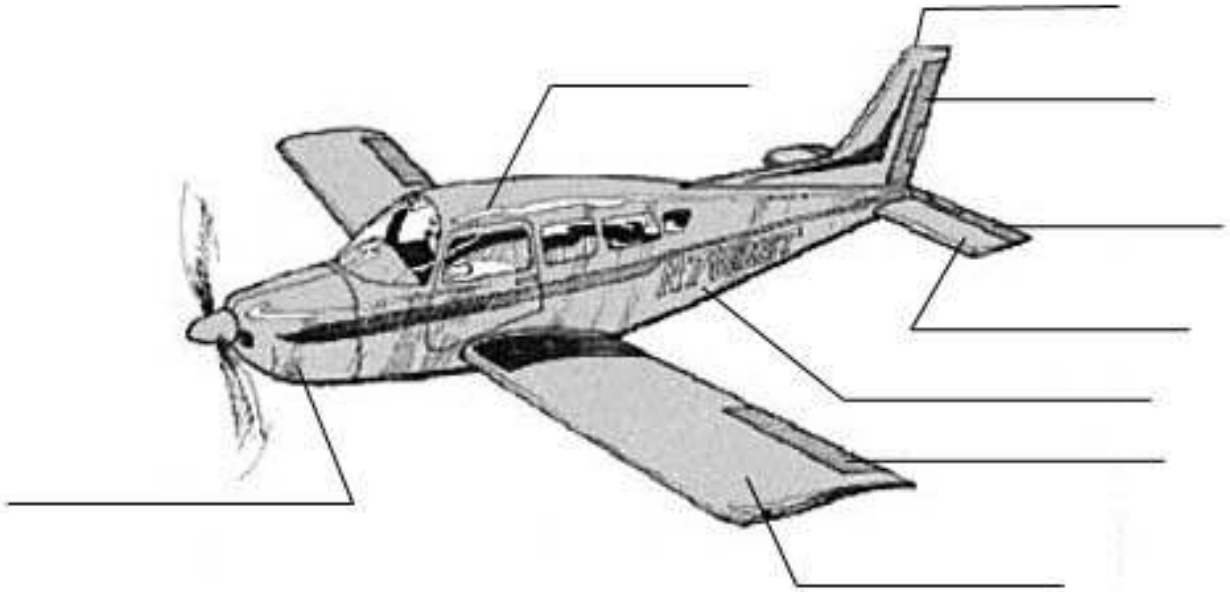
This airfoil (wing) shape is not correct. It will not furnish adequate lift. The plane will not glide at slow speeds.

The air currents hug the air foil. The air speed is much greater above the wing than below the wing, thus resulting in proper lift.
(Bernoulli's Principle)



The air currents cannot change direction this rapidly, thus creating a turbulence, not a smooth air flow.

Airplane Vocabulary



Power Plant-

Cockpit-

Wing-

Ailerons-

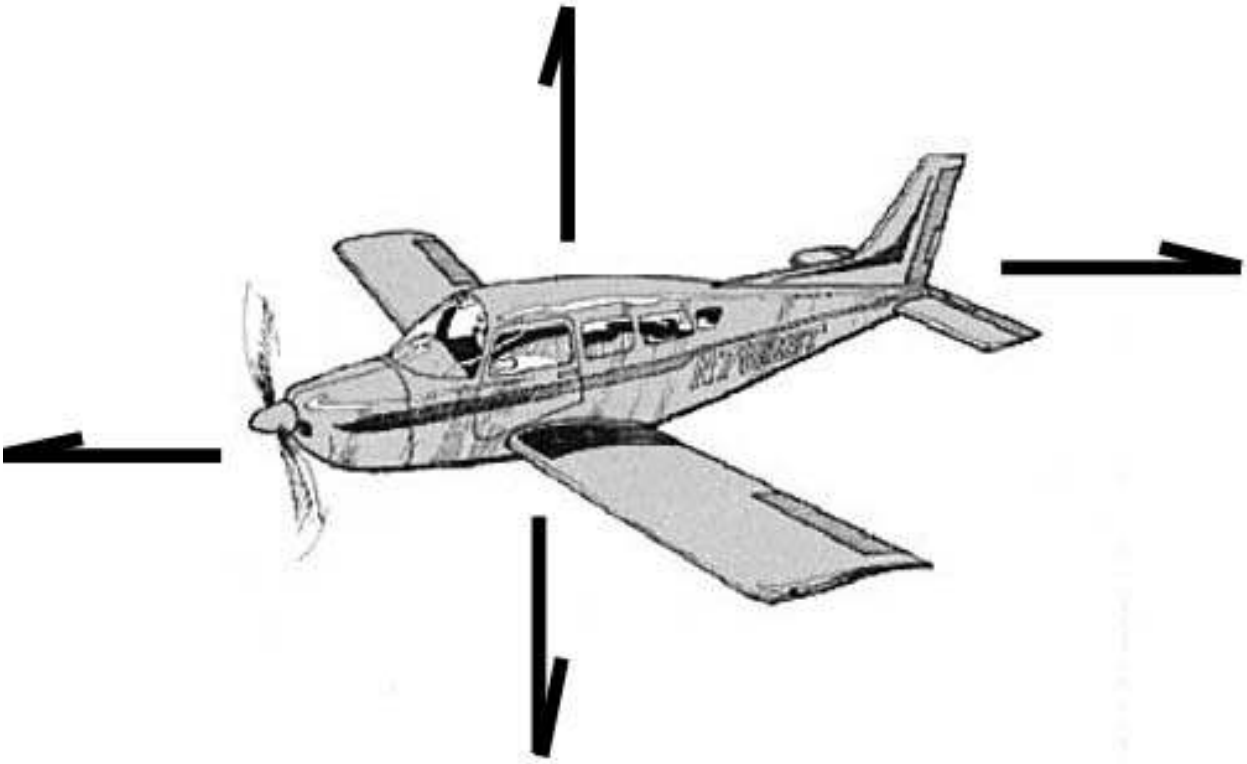
Fuselage-

Stabilizers-

Elevators-

Rudder-

Airplane Vocabulary



Thrust-

Drag-

Lift-

Weight-