



HOVERCRAFT

Construction Plans and Materials List

Purpose: 1) Demonstrate the force that air can exert under pressure. 2) Consider possible modes of alternative transportation. 3) Illustrate basic laws of physics. 4) Introduce process skills in mechanical engineering. 5) Provide opportunities for practicing research design, engineering and problem solving skills.

Materials: One-half sheet of 5/8" exterior plywood; backpack-style leaf blower 30 cc engine or greater (Husquarna, model 145BT with Kawasaki engine) or if used indoors an electric or battery leaf blower, like Black and Decker with 230 mph and 380 cfm; sheet of heavy plastic (6 mil) or heavy duty tarpaulin larger than the plywood; flexible dryer vent tubing (3"dia.) to match the nozzle on the leaf blower; plastic drain port with 3" diameter collar to hook air tubing, 1" x 15' ratchet tie down; 10" x 15" braced shelf bracket; metal door handle; staple gun, electric drill; 3" hole saw; skill saw; plastic can lid; 1 inch long 1/4 bolt, washer and nut; two 3/8" x 4@ eyebolts; assorted bolts, nuts and washers to mount leaf blower, plastic drain and handle.

Procedure: Cut the plywood into a circle with a diameter of approximately 4 feet. Drill a 1/4 inch hole in the center of the plywood and then cut a small hole (approx. 3") about the size of the opening on the plastic drain port (air duct tubing connector) about half way between the center and the outer edge. Attach the port with protruding pipe part of port facing up. Fasten port to platform centered over hole. Mount the air blower and engine assembly centered to the back side near port hole using mounting holes and shelf bracket. Attach flexible air duct tubing on to leaf blower outlet and other end to drain port. Use water hose clamps to get air tight fit. Duct tape can be used to insure a sealed connection. Cut the plastic sheet into a circle large enough to cover the bottom of the plywood platform and fold over the edge of the platform. Lay the plywood on top of the plastic, fold over to the top, and staple the plastic to the edge to hold it in place. Run the ratchet tie down around the edge and draw very tight to hold the plastic on the edge of the plywood and form an air tight seal. Cut six or eight small holes (approx. 1 2") holes in the plastic covering the bottom. Make sure that none of the holes line up with the intake port hole in the platform. The outlet holes should be evenly spaced and about halfway between the center and outer edge. If you wish to change the size or position of the holes, simply cover the old hole with duct tape. Poke a hole in a plastic coffee can lid and push a one inch long 1/4 inch bolt through the hole. Push the bolt through the plastic, then through the center hole in the board. Fasten with a washer and nut. This will give a billowing doughnut effect to the plastic when inflated. If the bolt protrudes too far, cover it with tape or rubber stopper. Take your seat fitting into the leaf blower and putting straps on like a seat belt. Under no circumstances should anyone to try to stand on the hovercraft while it is running. Have an assistant start the engine and give the engine acceleration with the remote control and be ready to float away. You may want to run a ring of foam insulation (15 ft.) around the outer edge of plywood platform to act as a bumper. Be careful!

Principle involved: The hovercraft will ride on a cushion of air, reducing friction. Depending on the air supply, it is possible to lift several hundred pounds.