Missile Projectile

Types of Projectiles
A projectile is an object upon which the only force acting is gravity.

There are a variety of examples of projectiles:
- an object dropped from rest is a projectile (provided that the influence of air resistance is negligible);
- an object which is thrown vertically upwards is also a projectile (provided that the influence of air resistance is negligible); and
- an object is which thrown upwards at an angle is also a projectile (provided that the influence of air resistance is negligible).

A projectile is any object which once projected continues in motion by its own inertia and is influenced only by the downward force of gravity.
Your assignment is to design and build an effective missile that maximize flight time. The missile will be launched by a cannon. The cannon, made of PVC, has a 39” long barrel, with a bore of (slightly more than ) 1½”. The combustion chamber is loaded with a fixed amount of propellant and is ignited to launch the missile. Safety is an ultimate concern, so missile deemed to be dangerous will not be launched and will receive no score. The objective is to maximize the time from launch to touch time. The missile may deploy but must remain in one piece. Each student must prepare his/her own design.
You should complete the design of your projectile during the early week and submit a sketch and written description of your design via email attachment by Thursday (November 30, 2006) for approval. An email acknowledgement will be sent to approve/disapprove your design. Please make sure you have elaborate enough details for easy understanding. Feel free to make an appointment with the instructor if necessary. The description should be prepared using Microsoft Word or other word processor software with embedded graphics created by any graphic package.
The description should include at least the following:

- The accurate design sketch, including dimensions and weight (not to exceed 3 ounces) of the projectile
- Materials used and justification
- An estimate of the flight (hang) time to be achieved (based on some assumed initial kinetic energy, friction, etc.)
Your should begin building your projectile as early as possible. No restriction on the cost issue as much as you can afford it. A finish product is expected in the lecture of the following week, December 5, 2006 for testing and revision.
During the lecture, you will have an opportunity to redesign your projectile based on information and ideas you may have gathered. You will bring your projectile (and supply materials) to class and briefly describe your design and changes that may have occurred since its original design. A final design approval will be given at that time. At the end of class, we will launch the final projectile south of the library or at a different location.