

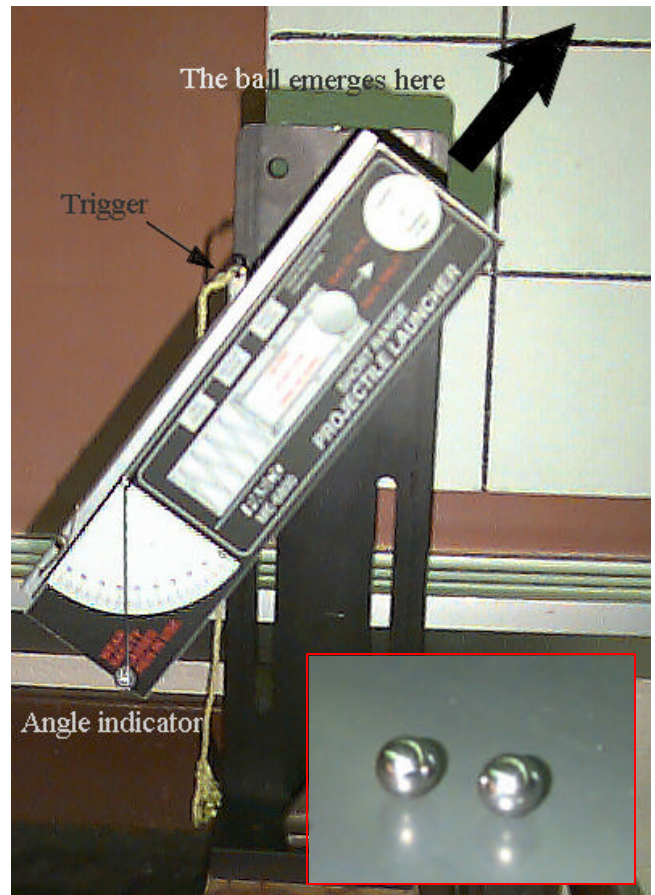
## Projectile Motion

This is the projectile launcher: a hollow tube with a spring inside. It has 3 launch speeds; use the fastest setting. Pull the yellow string *perpendicularly to the tube* to launch a shot.

The plumb bob shows you the launch angle. The launcher will move around after each lunch, so you'll have to be careful to reposition the launcher and verify the angle before each shot.

Also, you need to make sure that your shot trajectory is perfectly parallel to the chalk board.

The inset shows the cannonball: they are steel balls about 1 inch in diameter. Don't lose them!



To load the cannon, drop a ball in the tube, and then push it down all the way using the plastic ramrod shown here. Push it all the way in to get the fast setting.



You'll record the motion of the cannonball with a video camera, recording 30 frames each second.

If you combined all those frames, the result might look similar to the image seen here.

We'll record the x and y position of the ball at each time, and use this data to compute the acceleration and initial velocity of the ball.

The large background grid will help you analyze the video, so you'll want to determine their average size. Also, you'll have to account for *parallax* somehow ( <http://en.wikipedia.org/wiki/Parallax> ).

