

# PROJECTILE MOTION

HOW DOES THE ANGLE OF PROJECTION AFFECT THE RANGE OF A PROJECTILE?

First up - go to the website:

[http://phet.colorado.edu/new/simulations/sims.php?sim=Projectile\\_Motion](http://phet.colorado.edu/new/simulations/sims.php?sim=Projectile_Motion)

## What to do...

Using this simulation... (no air resistance)

- 1) Collect **sufficient and relevant** empirical data to support the claim that for any initial velocity  $v$  there is a “best angle” theta  $\theta_{ba}$  that yields the largest horizontal displacement  $\Delta x$ .
- 2) In your own words, describe why there is a “best angle” theta. Why do **both** smaller and larger launch angles give less horizontal displacement?
- 3) Derive a physics/mathematics proof for the value of  $\theta_{ba}$ .

## How you will be graded...

- 1) Supply the raw data (sufficient and relevant) from your experiments as well as an analysis of the data.
- 2) Write something that makes sense. Take your time and think. Give examples.
- 3) If you have a hard time doing the third step, that is OK. Just bring in all of your work.

*Your evidence and work must be able to stand trial in the court of physics (the honorable Judge M.OB presiding). The development of your argument, including a logical step-by-step process, is more important than your final answer.*