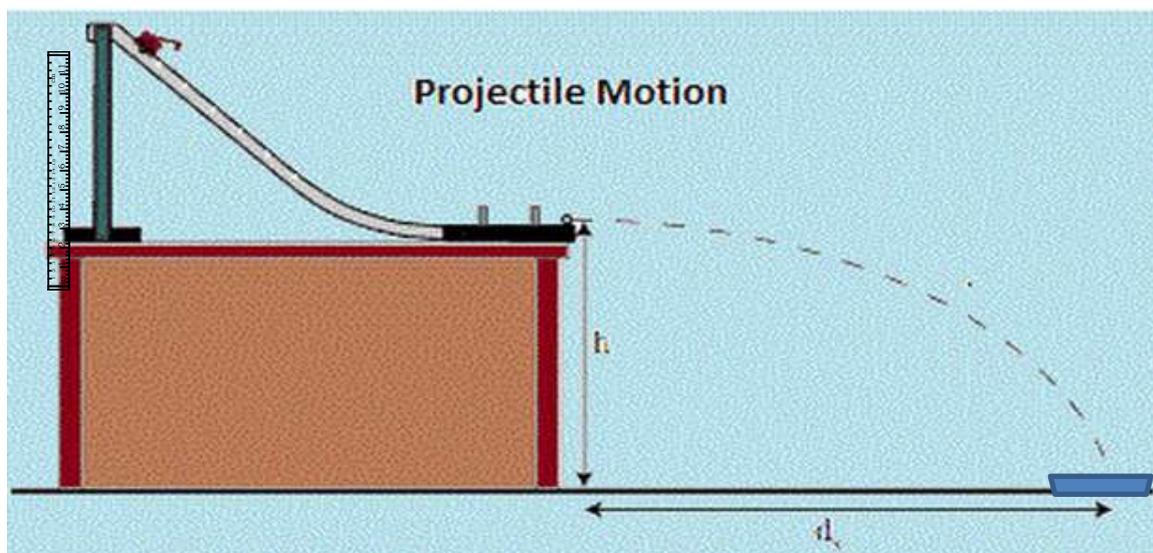


Variations in range of a projectile with launch speed

Equipment

Ball, projectile launcher, ALBA or other interface, metre stick or tape measure, sand, tray, carbon paper or timing plate, additional set of instructions for the PET timing device



Instructions

- Set up the apparatus as shown in the diagram above.
- Clamp the track securely to the bench or piece of wood that can be raised and lowered.
- Measure the release height of the projectile track and the sand tray, or timing plate.
- Release the ball from a known position up the slope.
- Measure the height of the ball on the slope from the height the projectile is released from the desk.
- Note the time it takes for the ball to cross the two timing gates so that the release speed of the ball can be measured.
- Adjust the position of the sand tray or carbon paper so that the ball lands in the sand or on the carbon paper and leaves a clear mark.
- Set the projectile launcher at different heights up the slope. For each measurement of range you should have a launch height up the slope, a release time/ speed and range of the ball.

Risk Assessment

- Check that the launch area is free of people who could get hit.
- Ensure no projectile is left unattended where it could become a trip hazard.
- Wear safety goggles as the projectiles are likely to be smaller than the eye socket, and may not always be very well aimed!

Background

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3. <https://www.bbc.co.uk/education/guides/zq2csrd/revision>
4. <http://www.physicsclassroom.com/class/vectors/Lesson-2/Horizontally-Launched-Projectiles-Problem-Solving>
5. <http://researchthetopic.wikispaces.com/What+is+projectile+motion%3F+-+R>
6. <http://slideplayer.com/slide/235777/1/images/26/Projectile+Motion+at+Various+Initial+Angles.jpg>
7. <https://www.physics.utoronto.ca/~jharlow/teaching/phy151f13/exp2.pdf>
8. <https://www.wired.com/2015/03/determining-maximum-projectile-range-numerical-model/>
9. <https://www.khanacademy.org/science/physics/two-dimensional-motion/two-dimensional-projectile-mot/v/projectile-at-an-angle>
10. http://images.motorcycle-usa.com/PhotoGalleries/1000px-Ideal_projectile_motion_for_different_angles-svg.jpg
11. <http://www.mrsciguy.com/Physics/projectiles.html>
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13. <http://dev.physicslab.org/asp/nyregents/1997/part4.asp>
14. <https://honorsphysicsrocks.wikispaces.com/Jimmy%2C+Erica%2C+Steve%2C+Elena+Projectile+Project>
15. http://www.batesville.k12.in.us/physics/phynet/mechanics/Projectiles/Labs/horizontal_projectiles.htm
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