

Physics worksheet – Projectile motion

( $g = 9.8 \text{ ms}^{-2}$ , no air resistance)

<p>Q1 A golf ball is projected vertically with a speed of <math>15 \text{ ms}^{-1}</math>. Calculate the maximum height reached by the ball.</p>	<p>Q2 A tennis ball is projected from a height of 1.5 m parallel to a horizontal ground. The speed of projection is <math>25 \text{ ms}^{-1}</math>. Calculate the maximum horizontal distance reached by the ball the first time it hits the ground.</p>
<p>Q3 It takes 3.0 s for a soccer ball kicked at ground level to hit the ground. Calculate the maximum height reached by the ball.</p>	<p>Q4 Calculate the initial velocity of the soccer ball in Q3 if the range of the kick is 20 m.</p>
<p>Q5 Calculate the speed of the soccer ball in Q3 at <math>t = 1.5 \text{ s}</math> and <math>t = 2.0 \text{ s}</math>. The ball is kicked at <math>t = 0</math>.</p>	<p>Q6 Determine the average velocity and average acceleration of the soccer ball in Q3 during its time of flight.</p>
<p>Q7 A champagne cork popped out from a bottle at 1.2 m above the floor. It lands on the floor at a horizontal distance of 5.0 m from its starting point 2.0 s later. Calculate the initial velocity of the cork.</p>	<p>Q8 Use the conservation of energy idea to determine the maximum height reached by the cork in Q7.</p>
<p>Q9 Use the conservation of energy idea to determine the landing speed of the cork in Q7.</p>	<p>Q10 Comment on the landing speed of the cork in Q7 if the bottle is tilted at a different angle and the initial speed of the cork remains the same.</p>
<p>Q11 A monkey on a tall tree branch is 8.0 m above and 25 m horizontally from a hunter's bow and arrow. At what angle should the hunter aim the arrow in order to hit the monkey in the shortest time if the shooting speed of the arrow is <math>30 \text{ ms}^{-1}</math>?</p>	<p>Q12 A smart hunter aims his arrow directly at a 'stupid' monkey on a tall tree branch some distance away. Hoping to avoid being hit, the monkey drops from the tree branch at the moment the arrow is shot. Describe and explain the fate of the monkey.</p>