# 4U Projectile Motion

1. Wile E. Coyote flies off a straight cliff on a sputtering piece of Acme equipment with a horizontal velocity of 36.0 m/s. The height of the cliff is 593m.
    a. How far away from the cliff bottom is he when he lands?
    b. What velocity does he land with?

2. A shotput is fired horizontally from a powerful launcher located at 44m above a horizontal plain, with a velocity of 245m/s.
    a. How long does the shotput remain in the air?
    b. How far away does it land horizontally from where it was launched?
    c. What is the <u>magnitude</u> of the <u>vertical</u> component of its velocity when it lands?

3. A cannon is fired at 30.0° above the horizontal with a velocity of 200.0 m/s from the edge of a cliff 125m high. Calculate where the cannonball lands on the level plain below.

4. A supply plane is diving at an angle 37° [BH]. When it released a package, the plane was at an altitude of 730.0m. Unfortunately the parachute failed to open and the package hit the ground 5.00s after being being released.
    a. What was the velocity of the supply plane? (hint : the answer is not 121m/s)
    b. How far did the package travel horizontally during its flight?
    c. What were the vertical and horizontal components of its velocity just before striking the ground?

5. A paintball is fired at a wall some distance away. The paintball was fired from the floor (h=0) at 18.87 m/s at an angle of 32° [AH]. Once it passes its peak height, the paintball hits the wall 2.5m up from the ground.
    a. How far away from the wall was the paintball launched?
    b. What was the <u>magnitude </u>of the velocity of the paintball when it hit the wall?

6. If you can kick a soccer ball at 25.0 m/s, what is the maximum horizontal distance you can kick the ball?

7. A player kicks a football off the ground with an initial velocity of 15.0m/s at an angle of 42° above the horizontal. A second player standing at a distance of 30.0 m from the first, starts running to meet the ball at the instant it is kicked. How fast must he run in order to catch the ball just before it hits the ground?

8. Solve the FoxTrot problem.
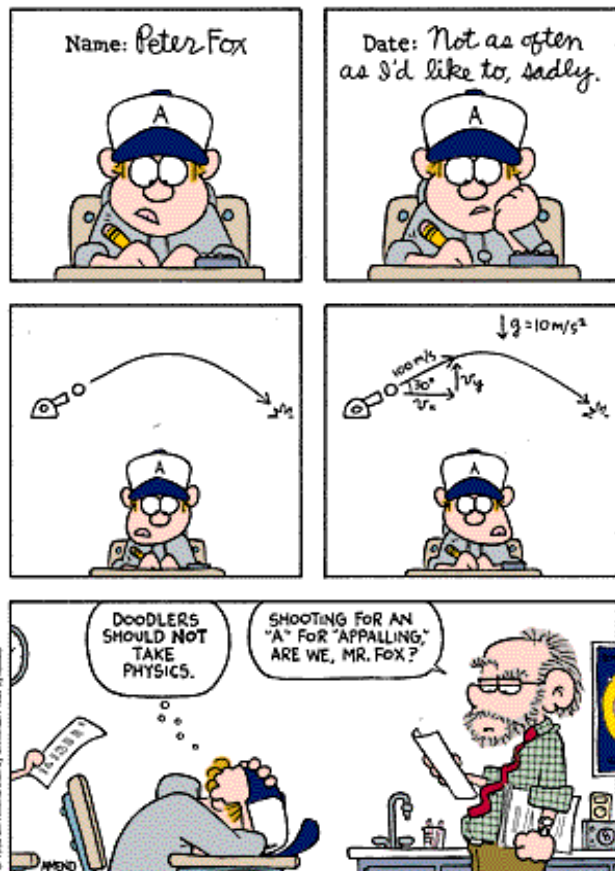
9. A projectile rises to a maximum height of 50.0cm and it travels a horizontal distance of 7.50m. If it is released and lands at the same height (i.e. a level launch), calculate the launch velocity it would need to follow this trajectory.