Horizontal Projectile Motion

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- Vx is constant
- (Ax is zero)
- Whether dropped or thrown, the vertical drop position is the same. Whether dropped or thrown, the vertical drop times are equal. Whether dropped or thrown, the vertical drop velocities are equal.
- Use TOF from free fall (drop).

TOF (from free fall)

- D = Vi x t + ½ x a x t^2
- D = 0 + ½ x 9.8 x t^2

- T = square root (D/(1/2 x 9.8))

How far from base of cliff

- Distance from base of cliff = Range
- = (Vx)(TOF)
- = (Vx)(square root (D/(1/2 x 9.8))

Example

- Given a horizontal projectile with Vx = 10 m/s.

  Given that this projectile is fired horizontally from the top of a 78.4 m cliff.

  What is TOF? How far from base does it go?

  TOF = square root (D/4.9) = sq rt (16) = 4 s

  Range = Vx x TOF = 10 x 4 = 40 m

Group Activity

- Determine the distance away from the base of the building that a horizontal projectile with Vx = 10 m/s will travel.
- 1. Empire State Building (D = 443 m)
- 2. CN Tower (D = 553 m)
- 3. Chrysler Building (D = 319 m)
- 4. Burj Khalia in Dubai (D = 830 m)

Use time from