

Motion in the “Real” World

1. How fast does the average skydiver fall when their parachute is closed?
2. When a skydiver's parachute is open do they fall straight down? If not explain how they move in relation to the x and y axis?



3. Now watch <https://www.youtube.com/watch?v=sbVQ33ujzFw> and talk about the jump in terms of motion in the x and y axis.

4. He reached a velocity of 614 *mi/hr* (988 *km/hr*). Why was he able to go so fast?

Here is the simple equation to include air resistance in a physics problem See why we ignore air resistance.

$$F_D = \frac{1}{2} \rho v^2 C_D A$$

F_D = drag, ρ = density of fluid, v^2 = Speed of the object in relation to the fluid, C_D = Drag coefficient, A = cross sectional area

Watch <https://www.youtube.com/watch?v=E43-CfukEgs> (We have seen this before, so you don't have to watch it but it's still cool)

5. Watch <https://www.youtube.com/watch?v=YL9sNrOIK-I> and explain the motion in relation to the x and Y axis of the skydivers and the plane during the stunt. (include a picture)

6. Why didn't the skydivers get hurt when they entered the plane going 137 *km/hr* (39*m/s*, 85 *mi/hr*). Explain your answer in terms of motion in the x and y axis.

7. Draw a picture of the plane and skydivers and include vectors of motion (you do not need to put values on the vectors just the arrows)

8. How is the jump from the high altitude different from the jump into the plane? What had to be different between the two?

9. Watch the two videos below and look at how Wile E Coyote falls off the cliff (look at the movement). How are they different and how are they similar? Fully explain which one is more accurate and why. Even the more accurate one seems to have a flaw, what do you think it is?

https://www.youtube.com/watch?v=Gq_bjal0NTo

<https://www.youtube.com/watch?v=8iBv5DK-8o4>

10. Wil E Coyote was chasing the Road runner and accidentally ran off a cliff. He was traveling at 180 m/s when he left the cliff and hit the ground in the y axis at 63.2 m/s . How far away from the cliff did he land? What was his total speed (x and y axis) when he hit the ground? (draw a picture and show all your work)