**Crime Scene #1 Hotel Jumper**

**Is this a Homicide or Accident?**

**The Crime:**

**You have been called here because the bell hop of the Odyssey Hotel discovered a body on the pool side patio and called the police. The police need your physics expertise to help with the forensics. Here is the relevant information we know at this time**:

1. Police have identified the victim as 22-year old John Einstein. Hotel records show that he is registered to room 415 of the Odyssey. The bell hop realized he had last seen Einstein at the pool-side bar around midnight. We are talking to the family to get more information on him. We are also trying to see if we can get hold of the friends he was last seen with to see if anyone might have been with him at the time of his death.
2. We haven’t ruled this as a homicide, suicide or accident (by the looks of the body’s location relative to the pool, we think he might have been trying to land in the pool). A CSI team is at the scene fingerprinting and collecting evidence.
3. The CSI team has constructed a scale model of the crime scene to aid your investigation. The scale is 20 cm on the model = 10 feet (at the actual scene)
4. Einstein’s room on the fourth floor was locked and the balcony door was open when the police first investigated.
5. Based on the condition of the body, the medical examiner has reported the body hit the ground at a vertical velocity of 20.5 m/s.

**We need you to determine a number of important facts related to this scene**.

1. We need you to determine if the victim fell from his room on the fourth floor and if not, which floor he actually fell from.
2. Once you are sure which floor he fell from, we need you to determine how fast he came off the balcony and determine if he was running or pushed/simply fell. In any case, we will assume that he came off the balcony with completely horizontal velocity and did not jump up first.
3. FBI Crime and physiology expert Dr. Carl Pratt provides you with a report showing typical velocities for various activities.

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| --- | --- | --- | --- |
| **Age Range** | **Gender** | **Walk (m/s)** | **Sprint (m/s)** |
| 18-25 | Female | 1.3 | 6.9 |
| 26-33 | Female | 1.2 | 6.7 |
| 34-42 | Female | 1.2 | 6.4 |
| 43-50 | Female | 1.2 | 5.8 |
| 51-62 | Female | 1.1 | 5.3 |
| 18-25 | Male | 1.4 | 8.1 |
| 26-33 | Male | 1.4 | 7.8 |
| 34-42 | Male | 1.3 | 7.5 |
| 43-50 | Male | 1.3 | 6.9 |
| 51-62 | Male | 1.3 | 6.1 |

Please fill out a whiteboard of your results including, in your expert opinion which floor the victim fell from, what the initial horizontal velocity was, whether this velocity is running speed or more like a push/fall, and if it was an accident or homicide. If he was running we will rule it an accident, but if his initial velocity was more similar to a push/fall, it will be treated as a homicide.

**Crime Scene #1**

**Follow Up**

Einstein’s friend Newton, indicated that Einstein was a good sprinter and an accomplished diver. Einstein had boasted that he could make it into the pool below his hotel window. As a physics student, Newton had told him that even though he could sprint 8 m/s, he could not make it to the pool from the seventh floor. Einstein, after a couple of beers, tried to prove Newton wrong, ran straight off the balcony and came up short. The police now ask you to show them how Newton determined that Einstein would not make it to the pool.

BONUS: Based on the running speed of 8 m/s, what floor would Einstein have to jump from to make it to the pool?