**Murder Methods**

* Projectile problem
* Tesla Coil
* Rail gun
* Concrete apple
* Solenoid; Magnetic decapitation
* Foucault Pendulum
* Radiation
* Capacitor
* Particle Accelerator
  + Maybe include cyclotron
* Harmonic Oscillator; Hooke law problem

**Characters**

* Albert Einstein
* Marie Curie
* Niels Bohr
* Rosalind Franklin
* Richard Feynman
* Cecilia Payne
* Vera Rubin
* Sir Isaac Newton
* Nikola Tesla
* Heisenberg
* Henry Norris Russell
* Stephen Hawking
* James Clerk Maxwell
* Michael Faraday
* Ernest Rutherford
* Paul Dirac
* Edwin Hubble
* Galileo Galilei
* Annie Jump Cannon
* Chien-Shiung Wu
* Erwin Schrodinger
* Max Planck
* Ernest Rutherford

**Prologue**

You, a lowly graduate student, have been invited to the annual Physics Social at Minkowski Manor. The social is regularly frequented by some of the largest names in physics and astronomy. Minkowski Manor is a large two story mansion with a basement. A heavy storm is brewing and in fact a downpour has already begun. However, the Physics Social is one of the largest events of the year and the host **(host)** regularly brags about the safety of the residence.

Upon entering you shed your rain soaked coat and are quickly greeted by **(friend1)** and Werner Heisenberg. They offer you a drink and you move into the Grand Lounge with your two comrades. The nights festivities begin but you have a feeling tonight’s Physics Social will be very different from any other….

**Story Start**

You are now drink **(random number between 1 and 10)** and swaying to the soft music playing in the background. The guests have all taken it upon themselves to move freely about the manor nosing their way through the host’s possessions. You lean in to tell Heisenberg a dirty joke when lightning strikes just outside the Dining Room window shaking the whole house with the deafening thunder. The power goes out and several screams are heard throughout the house along with various other noises you can’t identify.

You assume that some people must have fallen when the power went out. The power comes back on and everyone in the Grand Lounge is shocked to see **(GLmv)** lying on the floor motionless with a small arrow in their back. You are stunned and the **(host)** quickly yells to the butler to call for an ambulance and the police for a murder has occurred. **(host)** starts to tell everyone to remain calm as panic slowly starts to creep in among the party guests.

Just as everyone starts to calm down, to the extent they are capable of anyways after all a murder had just happened right in front of them, the butler returns to relay the news that the phones are down. The valet then drives the final nail in the coffin by telling everyone in the Grand Lounge that the road to the manor has been blocked by trees and that the small bridge has collapsed due to the raging waters caused by the downpour.

Slowly the eerie truth that they are stuck in the mansion at least until morning starts to sink into the minds of the party goers including yourself. After finishing the rest of your drink, you decide that you will use the knowledge you have obtained so far in your physics career to solve this murder so that no one else comes to harm.

**Grand Lounge Murder**

* Victim has been killed by a crossbow.
* Upon inspection of body give player:
  + Identity
  + Direction victim was facing
  + Where the victim was shot exactly (height from ground) **(var1 which will be related to the height attribute)**
* Upon inspection of room player sees:
  + Fireplace
    - Player notices the fire is burning bright; maybe **(guest4)** saw something since was standing near it
  + Large bookshelf with nic-nacs near the entrance to the dining room
    - Tennis trophy
      * Just a crummy tennis trophy
    - Pictures of **(hosts)**’s prized racing horses
      * Upon inspection find the small crossbow lying behind them
      * On it is a note that says “The projectile velocity of this bow is **(var2)** and the mass of the bolt is **(var3)**. I fired with the crossbow level to my shoulders. How tall am I? Assume the distance from shoulders to top of my head is 25cm.
  + Painting of **(host)**
    - you appreciate the fine brush strokes
  + **(guest1)**
    - Drinking heavily
    - Off putting and angry about being stuck with here
    - In slurring words tells you to leave them alone
  + **(guest2)**
    - Standing near the right side of the entrance to the dining room
    - Heard a snap from his right hand side near the book shelf
  + **(guest3)**
    - Breathing heavily; if watch is true then fiddling the watch
    - Doesn’t recall anything other than a scream coming from the direction of the foyer
  + **(guest4)**
    - Saw the silhouette of a person in the doorway of the dining room but lightning blinded him then the person was gone
  + Heisenberg
  + **(friend1)**
    - Says they will stay put to try and calm people down and will lay a sheet on the body once you finish inspecting it
    - Tells Heisenberg to accompany and help you
  + **(host)**
    - Appears oddly untroubled by the murder but does appear flustered by something
    - Will excuse himself to the kitchen to check on food for his guests so that hopefully it will help calm them
* **Solution**
  + 1st solve for t using t=d/v
  + 2nd solve for y initial using delta y = -1/2 g t ^2

**Nook Murder**

* Victim has been decapitated
* There is a bloody bar stuck in the wall
* Upon inspection of body:
  + Identity
  + Notice decapitation
* Inspect physics experiment
  + Notice large “U” shaped wire
  + Notice Voltage source and switch
  + Inspect switch
    - Switch appears to be able to be flipped remotely
  + The equipment appears to be sitting on top of sets of coils that generate a magnetic field that points up straight through the U shaped wire
  + If the switch was thrown a current would be generated that is counter clockwise if there was a wire, or conductor, connected across the U shaped wire
  + You measure the width of the U shaped wire to be **(var1)**
  + You also notice the voltage source has been set to **(var2)**
  + Doing some quick calculations you find out that the coils generate a magnetic field of **(var3)**
* Inspect window
  + Window is unlocked
* Inspect desk
  + **(nmv)** appear to have been nosing through **(host)**’s lab notebooks
  + **(nmv)** was trying to steal **(host)**’s notebook detailing how to unify gravity with the other forces
  + You also see the lab notes on the “rail gun”
    - In it you see that a metal bar is used to connect the circuit across the U shaped wire
    - In it you find the following equation:
      * , where V is the voltage of the voltage source, B is the field due to the coils, W is the width of the U shaped wire, and v the final velocity of the bar if the rail gun is fired
* Inspect dog statue
  + Just a crummy dog statue but you pet its head anyway
  + Notice a note taped to the statue
    - Note says “
* Inspect