

FATAL FUNDAMENTALS OF PHYSICS

BY

EVE ARMSTRONG

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Characters

AMANDA PALMIGIANI	Female, early 20's. Teaching assistant. Wears a Jake's Martial Arts shirt. Seems like a reasonable, intelligent person. Spunky and human.
MARTIN VAN CORK	Male, early 20's. Teaching assistant. Brilliant mind for physics, but kind of an ass. Aloof.
JESSICA DEE	Female, late teens - early 20's. Student. Sweet and hyperactive. Her drugs help to tone her down.
CHARITY COOM	Female, 20-50's. Student. Needs a good grade. Rather annoyingly desperate.
FELIX KAGYNSKY	Male, 20 - 40's. Student. Speaks like he's memorized the Oxford English Dictionary. Clever, insightful, ingenious.
SAMUEL T. ROSEN, PhD	Male, 70's. Professor of physics and victim of murder. Kind-hearted. Big presence but rather frail physical constitution.
ATHANIUS WEINSTRUB, PhD:	Male, 50-80's. Professor from across the hall. Befuddled, absent-minded, endearing.
CHADWICK M. FLETCHER, PhD:	Male, 35 - 50's. Dean of Student Affairs. Stiff, self-conscious, utter nerd.
INSPECTOR EDWARD MCPHRAY	Male, 30's - 50's. The classic Noir Inspector. Good at his job; enjoys the sound of his own voice a bit too much.
BEATRICE	Female: 20's-30's. Inspector's assistant. Smart and sexy.

Setting

A lecture hall at a private university, where undergraduates are attending the class: "Fundamental Concepts in Physics."

Time

The present.

Summary

Five minutes into his introductory physics lecture demonstration, Professor Samuel Rosen drops dead in front of his class of undergraduates. And it looks to be ... murder? Luckily, the local police inspector is attending the class. Unfortunately, he's never taken physics. And it seems as though he may need to learn some in order to figure this one out. Who killed the professor? Was it ... Amanda-the-grad-student, on the lab desk with the center-of-mass exploitation? Felix-the-frustrated-genius in his seat with the laser pointer? The suspects - and the myriad ways of exploiting physical concepts for dark purposes - seem too numerous to mention.

FATAL FUNDAMENTALS OF PHYSICS**ACT I**

At Rise: FELIX, CHARITY, JESSICA, INSPECTOR, and BEATRICE sit in “class” among audience. Enter AMANDA and MARTIN, disgruntled. AMANDA carries pile of papers.

We’re in here? AMANDA

Yep. MARTIN

Why? AMANDA

MARTIN
Who knows. I’m never on this floor either, you know. You got the homeworks?

Yeah. AMANDA

MARTIN
Oh, crap, I forgot the mat. It’s in the closet. I’ll be right back. (*Starts to Exit.*)

The mat? AMANDA

For the demo. MARTIN

AMANDA
We’re doing a demo today?

MARTIN
Yeah.

AMANDA
Why didn’t anyone tell me?

MARTIN
I don’t know, I’ll be right back. (*Exit.*)

AMANDA

(Hurt, but covers it. To class)

Good _____ *(morning/afternoon/evening)*, everyone. This is Professor Samuel Rosen's Fundamental Concepts in Physics. C1402. So if you're not here for that, you're in the wrong place. We're getting started a little late today. The first week's always a mess. Professor Rosen has a couple things he's still tending to in his office. Meanwhile I have the syllabi to hand out –

CHARITY

Amanda, can I give you my first problem set?

AMANDA

Um, I don't usually take them so early.

(Enter MARTIN.)

CHARITY

Oh, would it really be a lot of trouble? I don't do so well in science classes, I really want to start off on the right foot.

AMANDA

Okay, let me check with Sa – I mean, Dr. Rosen first, okay? It probably won't be a problem.

CHARITY

What if it is a problem?

AMANDA

Well, I don't think it'll be a problem.

MARTIN *(To AMANDA)*

Couldn't find it.

AMANDA *(To MARTIN)*

What?

CHARITY *(To AMANDA)*

But what if it is a problem?

MARTIN

The mat.

AMANDA *(To CHARITY)*

I don't know what will happen if there's a problem, so why don't we just for now assume that it won't be a problem, and you can wait until I talk to him? Or you can ask him yourself.

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MARTIN (*To AMANDA*)

The mat.

AMANDA

Why were you looking for the mat?

CHARITY (*To AMANDA*)

Oh. Oh, I'll ask him myself. God, I hope it's not a problem.

AMANDA (*To CHARITY*)

Okay. (*To MARTIN*) What was the mat for?

MARTIN

The demo.

AMANDA

Okay, why didn't I know about this demo?

MARTIN

It was an easy setup, it didn't need two people.

AMANDA

I'd still appreciate being told what's going on around here. I don't like feeling like I have to run around asking – (*remembers Class. To Class*) Um. So everyone, I'm Amanda Palmigiani, this is Martin van Cork; we'll be your TAs for the class. We're going to hand out –

CHARITY

So because I am going to have a real problem if this turns out to be a problem. Do you think I can talk to him after class?

AMANDA

I don't see why not. (*To Class*) So we're going to hand out –

CHARITY

Should I talk to him here after class, or should I find him in his office later?

AMANDA (*Losing patience*)

Charity, it's up to you. I need to start class now. (*To Class*) We'll come around and hand out the syllabi in just a minute. Once Professor Rosen gets here, you'll get to start the semester with an interesting demonstration on ... (*To MARTIN*) What's the demo?

MARTIN

Gravity.

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AMANDA

Jeez, that stupid gravity one? It's only the first day.

MARTIN

No, not that stupid gravity one. The other stupid gravity one.

AMANDA

Which one?

MARTIN

The one in handbook C.

AMANDA

I haven't got handbook C, I thought that was for the lower-level course.

MARTIN

It is; we're using it. Apparently Rosen (*pronounces it incorrectly, like 'rah-zin'*) doesn't have high expectations for the people in this course.

AMANDA

Jesus, why am I even a TA if no one ever tells me anything?

(FELIX and JESSICA have made their way to the front.)

FELIX

Excuse me, I don't mean to interrupt this fascinating public display of frustration, but I have a question.

JESSICA

It's a private institution, you know.

FELIX

Yes, that's right.

AMANDA

We're actually getting ready to pass out some handouts before class starts.

FELIX

I just have a minor technical question about a detail in Chapter 12.

(Pause)

MARTIN

You've already started reading the text?

FELIX

Oh, I've completed the text. Apologies for being vague, I am actually referring to Griffiths' advanced treatment on quantum mechanics, second edition. I was confused by a step in the proof that any operator representing an observable must be Hermetian.

(Pause)

MARTIN

Um. It sounds like this class might not be, um, right for you. You've taken physics before?

FELIX

No. This will be my first class. But I find it all utterly captivating and I read ahead.

AMANDA

We won't get as far as quantum mechanics this semester.

FELIX

Oh, is that so? What a terrible nuisance. Well, perhaps I can avail myself of the good Professor's office hours, after class?

MARTIN

Great, yeah, do that.

FELIX

Marvelous. Thank you.

AMANDA

(Handing some syllabi to MARTIN)

Take some of these, will you?

(They both start handing them out. These handouts will give an overview of the course, outline various concepts. Header at top lists room number 210.)

JESSICA

Oh, I ... excuse me, I just wanted to talk with Uncle – Professor Rosen – personally for a moment before class.

MARTIN

He's not here yet.

JESSICA

Oh, right. Well, he's actually family. Well, kind of family. I was hoping to say hello before he starts. To tell you the truth I'm pretty thrilled to be related to – well, sort of related – to a man of his stature. I am so excited to be in his class!

AMANDA

(Continues handing out papers)

That's great. I hope you're not disappointed.

JESSICA

Oh, I won't be! I'm sorry if I seem a little hyper. I'm a little nervous. Really nervous. I'm – I'm sweating. Wow, I'm flipping out. I'm totally flipping out, I can feel it! I should never wait for my meds until lunch. I'm so sorry.

(Fumbles in backpack. Removes small container of capsules.)

Uh oh, where's my water?

(Enter FLETCHER who walks to podium, pulls out speech.

Doesn't once look up before starting speech.)

AMANDA *(To JESSICA)*

Hey, calm down, there's a fountain in the hall, and there's also a drink vending machine – you can buy a bottled water.

JESSICA

Oh, really? Oh, that's so great, thank you so much.

(Starts to Exit; halts when FLETCHER begins speech. AMANDA and MARTIN are still passing out syllabi.)

FLETCHER

Ladies and gentlemen, students, of Huxley University, welcome to the first in the series of Fundamental Concepts in Physics lectures. I am Doctor Chadwick M. Fletcher, Dean of Student Affairs. This semester, Fundamental Concepts in Physics will be taught by our honored guest for 20__ *(whatever year it is)*: The Distinguished Professor of Theoretical Physics at Princeton University and winner of this year's Canter Award, which, along with a considerable monetary contribution to the professor's research projects, gives the students of our university the opportunity to take this course with him. And now, let me cause no further delay in introducing to you Doctor Samuel T. Rosen.

(During this speech, MARTIN and AMANDA have been half-heartedly trying to stop him with various "He's not here yet!"s.)

Let's give him a round of applause!

(Applause. Awkward pause, as it becomes clear that ROSEN is not here. By now AMANDA and MARTIN have finished passing out papers and have returned to front of class.)

AMANDA

Er, Mr. Fletcher, Dr. Rosen is actually not exactly here yet.

FLETCHER

That's Doctor Fletcher, Miss.

AMANDA

Excuse me, Doctor Fletcher. But Dr. Rosen is not here yet. He's running a couple minutes behind schedule today.

FLETCHER

Oh, is that right. I suppose I'll wait, then. Will he be long?

AMANDA

No, he should be here any minute.

FLETCHER

Very well, I suppose I can wait.

(Leaves podium to converse with AMANDA.)

May I ask you if the Professor has anything special prepared for his introductory lecture?

(Enter WEINSTRAUB unnoticed, with a mess of papers. Makes his way to podium, looking alertly at Class.)

AMANDA

Actually he has some kind of demonstration to present, but I don't know what it consists of because I didn't set up –

JESSICA

(Still nervous and hyper. To AMANDA)

I'm sorry to bother you again, but how much time do I have before Professor Rosen gets here? I need to go get water but I don't want to miss a moment of his brilliant oratory skills.

MARTIN *(To JESSICA)*

Are you sure we're talking about the same Professor Rosen?

WEINSTRAUB

(Happy to be here; to Class)

Whew, there. Sorry for my tardiness. Welcome to –

(checks his notes)

-- Advanced Quantum Chromodynamics II. My name is Athanius Weintraub, but most everyone in the department calls me Thanie. You're welcome to do the same, although if it makes you uncomfortable I completely understand and won't be offended in the least –

MARTIN

Uh, Professor Weintraub, I don't think you're in here today.

WEINSTRAUB *(Doesn't hear)*

Now as you know, QCD is a non-abelian gauge theory, developed to model the strong interaction, and we'll begin class with a brief review of basics. The gauge-invariant QCD Lagrangian is –

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MARTIN

Professor Weinstraub?

WEINSTRAUB

Yes, my boy?

MARTIN

I think you're in the wrong place. This is an intro physics class. Undergraduate.

WEINSTRAUB

Oh? No, that can't be.

MARTIN

I think it can.

WEINSTRAUB

But I specifically booked this room for my electricity and magnetism demonstrations next week. It's the only lecture hall that's equipped. Room 213, I specifically asked for room 213.

MARTIN

Professor Weinstraub, room 213 is across the hall.

WEINSTRAUB

Is it – no, it can't be. Room 213 is right here.

MARTIN

Sorry, Professor, I hate to be the one to break it to you, but this is room 210. Come with me, I'll show you.

WEINSTRAUB

Well, all right, young man, if you're so sure of yourself.
(*Exit MARTIN and WEINSTRAUB.*)

PROFESSOR ROSEN

(*Enter from opposite side, at the same time.*)

Oh! There you all are.

AMANDA

Sa – Professor Rosen! Great.

ROSEN

213 again. I'd asked Walter to change this around for me, he knows I don't need all the frilly bells 'n whistles in here.

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AMANDA

Oh, I believe he did change it for you, Professor Rosen. This is actually room 210.

ROSEN

Is it, now? (*Looks around.*) Well, that's funny.
(*Enter MARTIN and WEINSTRAUB.*)

WEINSTRAUB

Well, I'll be a monkey's uncle. You don't suppose they changed the numbering system, do you?

MARTIN

I'm pretty sure the numbers are the same as they've always been, Professor.

ROSEN (*Coughs*)

Goodness, I could use some water. (*Sees WEINSTRAUB*) Hello Athanius, can I do something for you?

WEINSTRAUB

Sam. (*Pause. Startled; recovers.*) Why, hello. Well actually, I suppose it would be nice to have some chalk from the podium drawer. Would you mind terribly if I foraged?

ROSEN

Certainly not, go right ahead.
(*WEINSTRAUB opens podium – inside faces away from Class.
He rummages.*)
All right, I believe we are ready to begin. Welcome to –

FLETCHER

Professor Rosen, I believe I have the honor of introducing you today.

ROSEN

Oh that's not necessary, my good man, I can introduce myself. Thank you.

FLETCHER

Oh! ... All right. (*Sits.*)

JESSICA

(*Still nervous and hyper.*)
Uncle Rosen, hello! I'm Jack's daughter, do you remember me?

ROSEN

Er ...

JESSICA

I came to see you in the hospital last year.

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ROSEN

Oh, yes. Yes, of course. *(Pause as he tries to remember)* Jenny.

JESSICA

Jessica.

(Exit WEINSTRAUB toward room across hall.)

ROSEN

Jessica, of course. How is your father doing? I haven't talked to him in all of two weeks.

JESSICA

He's fine, fine. Thanks for asking. It's so good to see you feeling better.

(CHARITY approaches podium.)

ROSEN

Why, thank you. *(Coughs.)*

JESSICA

Do you need some water?

ROSEN

(Still coughing)

That would be good, actually.

JESSICA

I need some too anyway. I'll be right back.

(Exit, holding pill container full of capsules.)

CHARITY

Professor, Hello, I'm Charity Coom. Again. *(Giggles.)* I just wanted to give you my problem set one before class starts.

(She is holding it carefully on the sides.)

ROSEN

Well. Miss Coom, quite persistent, aren't we? *(Laughs genially.)* Thank you, I'll take that off your hands. Good luck

(Takes it carelessly, touching the ink, tossing it on the desk. Coughs.)

CHARITY

Thank you, Professor. How soon will I get it back?

ROSEN

In good time, Miss Coom. *(To Class)* Welcome to Fundamental Concepts in Physics, everyone. I'm Sam Rosen. I'm a professor of theoretical physics; lately my interests

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ROSEN (cont'd)

have been mainly focused on QCD theory - that's quantum chromodynamics. Don't worry, we won't be covering that many syllables this semester.

(Pause for laughter, regardless of whether there is any.)

It's a model for the behavior of what we believe to be the fundamental particles of nature. Now, as for our purposes this semester. I'm sure you're all aching for the syllabus, which I have not yet prepared.

(CHARITY returns to seat.)

AMANDA

It's already handed out, Dr. Rosen.

ROSEN

Ah, splendid.

(Enter WEINSTRAUB.)

JESSICA

(Enter with cup of water and pill container nearly empty. She is markedly calmer. Remains this way through the rest of the play.)

Here you are, Professor Rosen.

(Waits for his 'thank you' before returning to her seat.)

ROSEN

Thank you, Miss.

(Drinks water, places it on podium. Continues.)

WEINSTRAUB

I say, Sam, can I have a word –

ROSEN

(Doesn't hear him)

Now, it's a tradition of mine to begin the first lecture with a little demonstration. Can I have the lights off, please?

(MARTIN turns lights off.)

(BLACKOUT. Some clanging, other strange noises, then silence. Pause.)

AMANDA

Dr. Rosen, are you going to start?

(Pause)

MARTIN

You aren't lost, are you, Dr. Rosen?

(Pause. MARTIN Snickers.)

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AMANDA

Do you think he got lost in the dark?

MARTIN

Nah, he's done this one a hundred times.

AMANDA

But never in room 210.

(Pause)

MARTIN

Professor Rosen, are you all set up over there?

AMANDA *(To MARTIN)*

Turn the lights up.

(This takes MARTIN a long time, so he could conceivably have time to return to his position by switch, if he moved while the lights were off.)

(LIGHTS UP. MARTIN stands by switch. AMANDA stands on opposite side of room, where she was when lights went out. ALL OTHER ACTORS are where they were when lights went out; staggered apart from each other.

(ROSEN lies on the floor by podium.)

MARTIN

Uh ...

(Various reactions. AMANDA, MARTIN rush to him.)

Shit. Um, Dr. Rosen?

AMANDA

Sam?

MARTIN

Shit.

AMANDA

Sam, are you all right?

MARTIN

Think he's faking?

FLETCHER *(Rises)*

Perhaps someone should call campus security.

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AMANDA

Yeah. *(Pulls out cell phone.)*

MARTIN

Campus security? Are you serious? They won't even show up until tomorrow.

AMANDA

Should I call an ambulance?

FLETCHER

Yes. Call an ambulance. *(To Class)* There isn't a doctor out there, is there?

MARTIN

Aw, don't call a friggin' ambulance. He's faking. Doctor Rosen, come on. We're already running 15 minutes late. I can't stay after, I have track practice.

FLETCHER

Is there a doctor? Anyone?

INSPECTOR *(Rises)*

I'm not a doctor, but perhaps I can be of assistance. Beatrice, join me, will you? Guard the exit.

BEATRICE

(Has risen with him)

I'm on it, Eddie. *(Stands by Exit.)*

INSPECTOR

(Joining cluster of people around ROSEN)

All right everyone, can I ask you all to clear away so I can examine the man?

FLETCHER

Excuse me Sir, you aren't a doctor?

INSPECTOR

Not in the medical sense, no.

FLETCHER

Who are you?

INSPECTOR

Inspector Edward McPhray of the University's Private Investigations Bureau. I need this class for my continuing ed requirement. Apparently it's a good thing I decided to take it this semester. Perhaps I'll get extra credit for solving this particular physical situation.

(Feels ROSEN's pulse.)

Yes, this man is dead.

AMANDA

Oh! No!

MARTIN

Shit.

WEINSTRAUB

Oh dear me, how monstrous.

FLETCHER

Excuse me, Sir, but if you're not a doctor, what gives you the authority to say whether or not a man is dead?

INSPECTOR

His resting heart rate, Mister. It's gone. Kaput. I'm no biologist, but I am a private eye. And I can say with hundreds of corpses to back me up, that this man's ticker has ticked its last. Beatrice, phone for an ambulance and get forensics over here, will you? Call Yeager and Kaye for backup; make sure nobody leaves the room. I'm gonna learn as much as I can about the situation until they get here.

BEATRICE

Sure thing, Eddie. (*Exit.*)

WEINSTRAUB

Oh dear me, how positively atrocious. Will you all be needing this lecture hall any longer, then? I've examined the room across the hall, and unfortunately –

FLETCHER

Inspector McPhray, I must be the voice of the students in an affair of this magnitude. The students must be cleared from the room. Such an event, especially during the first week, is not a positive reinforcement for student morale.

INSPECTOR

And I must be the voice of this dead person, Sir. The students are not to leave. I heard no doors open or close in the darkness before or after the Professor died. That means that whoever killed him is still in this room. As for the students' interests, just look at them – their attention is riveted. How often do you see that in an introductory physics lecture?

FLETCHER

Whoever killed him? Why, my dear fellow, Professor Rosen could have simply had a heart attack. He wore a pacemaker, you know.

INSPECTOR

He wore a pacemaker?

FLETCHER

That's right.

INSPECTOR

All right, everybody, I'm going to need your undivided attention. The good Professor was about to deliver his opening lecture with a demonstration. Did anyone in here know what the demonstration would consist of?

MARTIN

Yeah, I did. I set it up.

INSPECTOR

Did you.

MARTIN

Yeah.

(Enter BEATRICE.)

INSPECTOR

Well, whatever the contents of the lecture were, the professor never managed to make it to his first slide. Perhaps the killer wanted to make sure that he wouldn't. I think we should begin the investigation with an examination of this lecture he was about to deliver.

(He walks to power point control. Flips switches as he mumbles.)

Okay, I think this'll do it .. nope, wait a moment .. Ah.

(Up pops Maxwell's equations in vacuo.)

For the love of God, what is that?

BEATRICE

I think you started nearer to the end of the semester, Eddie.

INSPECTOR

You mean near the end of a four-year major in physics, don't you? What *is* this?

AMANDA

Maxwell's equations.

INSPECTOR

Maxwell's equations?

BEATRICE

It can't possibly be the opening lecture. It looks like it comes near the end.

AMANDA

That's right, it's about $\frac{3}{4}$ of the way through semester two, actually.

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INSPECTOR

He has the entire *year's* lectures on here?

AMANDA

Yes.

MARTIN

Are you serious? Jeeze, how anal can you get?

INSPECTOR (*To MARTIN*)

You weren't aware of that?

MARTIN

No, but I guess it shouldn't surprise me. The guy has the friggin' colors of his socks scheduled in his daily planner.

AMANDA

He's –

(pause, chokes back tears)

was a very thorough man.

INSPECTOR

Okay, first piece of the puzzle. First snapshot. The good professor was an organized man who planned ahead.

AMANDA

(Hushed, to INSPECTOR)

Inspector, do you mind if we rewind a bit? I think this slide might be scaring the students. This class has a notoriously poor retention rate. I don't want to start off on the wrong foot.

INSPECTOR

Frankly Miss, it's a little late to start off on the right foot. And I don't see how how you'll retain students anyway, when their teacher is lying in a decaying heap on the lecture hall floor.

(AMANDA bursts into tears, runs to back of room, sits, sobbing.)

BEATRICE

That was harsh, Sir.

INSPECTOR

Aw Christ, I'm not here to baby-sit a bunch of impressionable children.

(Moves to overhead.)

Let's see if we can find the root of this madness. *(Searches. Finds it.)*

(Overhead displays:

INSPECTOR (cont'd)

“Fundamental Concepts in Physics

Professor Samuel T. Rosen

Tue, Thu: 1:15-2:25pm

Warren Lecture Hall, Room 210.

Blah blah blah (Must include enough information to distract AUDIENCE from the room number listed.)”

Oh, thank God, English.

BEATRICE

Math is a language too, Sir, you know. You're just not fluent in it.

INSPECTOR

Hey, I can count, all right? That's sufficed for my entire life. I'm not about to start embellishing now.

(Switches to next slide, which displays Newton's three fundamental laws:

“ISAAC'S NEWTON'S THREE FUNDAMENTAL LAWS OF MOTION

1. Inertia An object in motion at constant velocity will stay in motion at that velocity unless acted upon by an outside force. A motionless object will stay motionless unless acted upon by an outside force.

2. $F=ma$ The force an object exerts equals the product of its mass times its acceleration.

3. $F_{ab} = - F_{ba}$ For every action there is an equal and opposite reaction.”

Aah!

BEATRICE

Unfortunately, Sir, if the clue to the killer's motive lies in today's presentation, then math might be the only language we can use to solve this murder.

INSPECTOR

And I thought nothing could have beaten that one case in Namibia last year, with the clicking tongues. Mine still twists up in knots in the middle of the night. Wakes me up. But you may be right, Beatie. We gotta work through this entire course. So what's this?
(Reading from slide)

“Inertia: An object in motion at constant velocity will stay in motion at that velocity unless acted upon by an outside force. A motionless object will stay motionless unless

INSPECTOR (cont'd)

acted upon by an outside force. Does this mean that if I want my fifteen-year-old to get his ass off the couch, I'll have to kick him?"

BEATRICE

Likely. And if anyone wanted to stop you from continuing this investigation, they'll have to tie you to a chair.

INSPECTOR

Interesting. Now, "F=ma". What's F?

MARTIN

Force.

INSPECTOR

What's m?

MARTIN

Mass. A is acceleration. It tells you what force is exerted by an object of a certain mass that's accelerating.

AMANDA

Like a car. Say you have a 5000-kg car accelerating at 8m/s^2 . (5000kg) times (8m/s^2) is 40,000 Newtons.

INSPECTOR

So what?

AMANDA

So nothing. I'm just telling you. You can figure out what kind of an effect an object will have on, say, a tree – if you know its mass and its rate of acceleration.

INSPECTOR

How about F_{ab} equals negative F_{ba} ?

MARTIN

For every reaction, there is an equal and opposite reaction. The force the earth exerts on you is the same as the force you exert on the earth.

INSPECTOR

Are you saying I exert a force on the earth?

MARTIN

Yep.

INSPECTOR

But it doesn't go anywhere.

MARTIN

It doesn't go *far*. It's so much more massive. The more massive an object is, the less any given force will affect it. But seriously – when you jump up in the air, you fall back down – and at the same time the earth falls back *up* toward you. The change is so minute that you don't notice it. *(Pause)*

INSPECTOR

Moving on.

(Flips slide. Up pops angular momentum and torque:

“Angular momentum = mass x velocity x radius.

“Torque = Force x radius.”

What's torque?

AMANDA

It's kind of the rotational equivalent of force. In a general sense, force is measured along a straight line. Torque is measured along a curved line. You need force to push a box ahead of you; you need torque to swing open a door on a hinge.

INSPECTOR

So this says that a small mass, when positioned strategically, can wield a great deal of power.

BEATRICE

Like in the martial arts. When a tiny person flips over a huge person.

INSPECTOR

Ah. What an apt comparison. *(To AMANDA)* Ms. Palmigiani, I notice you're wearing a Jake's Martial Arts tank top. Do you train there?

(Pause)

AMANDA

No.

INSPECTOR

Did you train there?

AMANDA

Yes. Why?

INSPECTOR

Just curious. Let's go forward, shall we?

(Flips slide forward. Up pops:

INSPECTOR (cont'd)

“Viscosity affects the flow of fluid in a tube.”

Flow = Pressure / Resistance

Resistance = Viscosity x Length / diameter⁴

BEATRICE (*Reading*)

“Viscosity affects the flow of fluid in a tube.” Well, sure, that makes sense. Viscosity is a measure of a fluid’s resistance to flow. Water has low viscosity compared to molasses.”

INSPECTOR

So that’s why, when you fill a balloon with water and pop it with a pin, the water drains out, but if you fill a balloon with honey and prick it, the honey won’t leak out as fast. Unless you were to, say, hurl it at the brick wall of Headquarters downtown.

BEATRICE

How do you know that?

INSPECTOR

Oh, you know – just common sense.

AMANDA

The honey will leak out if the hole is big enough.

INSPECTOR

Hm. But even if you drop it on someone’s head, nothing much happens.

FELIX

Quite likely you needed to fill it with an ampler supply of honey. In order for the surface tension in the rubber to be sufficiently high to cause balloon breakage upon impact, it must be stretched considerably taut. My surmise is that the honey did not adequately stretch the balloon’s rubber so as to create the necessary –

INSPECTOR

Thank you, Mister Kagynsky, We’ll get to you in good time.

MARTIN

Can “surmise” be a noun?

BEATRICE

Why?

MARTIN (*Indicating FELIX*)

He just said –

INSPECTOR

And Thank you, van Cork, you've had your turn. Let's move forward.
(Flipping forward.

“Capillary Action: The flow of liquids through porous media. In a capillary tube, surface tension pulls the liquid column up until there is a sufficient mass of liquid for gravitational forces to overcome intermolecular forces.

*“Height that liquid rises in tube = $2\gamma\cos\theta/\rho gr$
 where γ = liquid-air surface tension
 θ = contact angle
 ρ = density of liquid
 g = gravitational acceleration
 r = radius of tube”*

Capillary action?

AMANDA

It's how water travels in soil. Or how water travels through tubes. Have you ever noticed that when you stick the tip of a sponge into a shallow plate of water, the water seeps up into the sponge higher than the water level?

INSPECTOR

No.

AMANDA

Well, it does.

INSPECTOR

I'll take your word for it.

(Flips forward. Up pops picture of a grapefruit and a grape both falling from tree, and

$$x = 1/2gt^2."$$

Oh, gravity. I kinda get this. Kinda. So this is saying that the acceleration of gravity acts on all masses the same. A grape will fall at the same rate as an elephant. *(Pause.)* But what about a feather, or a piece of paper? They kinda flutter down.

AMANDA

Oh, that's just air resistance – it'll have a much larger effect on something with more surface area. But in a vacuum, in the absence of air resistance, a feather will fall as quickly as an elephant.

INSPECTOR

Really.

AMANDA

Yes. In fact, this equation here: $x = 1/2gt^2$, tells you that if you know the distance of the fall, x , and you know g – the uniform gravitational acceleration, then you can figure out the time t it takes to fall. You'll notice that mass doesn't appear in the equation – the time is independent of the object's mass. And the speed with which the object finally hits the ground is simply that time t , times g . For any object, anywhere on the Earth's surface.

INSPECTOR

So if I drop a pencil from the Empire State building, I just have to know how high the Empire State Building is, and I can calculate how long it'll take the penny to fall, and its speed upon hitting the ground?

MARTIN

Yep.

INSPECTOR

That's actually useful. What about on another planet?

AMANDA

Then g is different. The value of g depends on the planet or moon or star, or whatever, that you're on. But the calculation is the same.

INSPECTOR

(Finally seriously interested. Peers at slide one more time before flipping forward.)

Do grapes grow on trees?

MARTIN

Uh ...

INSPECTOR

Nevermind. Irrelevant.

(Flips forward. Up pops a picture of a solenoid with current flowing through.)

BEATRICE

Magnetism! I love this stuff.

INSPECTOR

You know what this means?

BEATRICE

Sure.

INSPECTOR

Thank god.

BEATRICE

This shows that if you have a conducting material – metal – wrapped in a coil, and then you start an electric current going through the solenoid, it will produce a magnetic field.

INSPECTOR

A solenoid?

BEATRICE

That's what you call the coil.

INSPECTOR

A solenoid. A coil of wire. Why does it have to be metal?

BEATRICE

Metal is a good conductor. Its electrons aren't bound too tightly to the atom's nucleus; they can move around.

INSPECTOR

What does the solenoid do if there's no current going through it?

BEATRICE

Nothing, it just sits there.

INSPECTOR

But if you start running a current through it, suddenly there's magically a magnetic field?

BEATRICE

Yep.

INSPECTOR

Why?

AMANDA

A current is a moving stream of charged particles. Like electrons, say. Moving charges induce a magnetic field. That's another thing that you get out of Maxwell's equations.

MARTIN

You can compare magnetism to gravitation. A gravitational field affects any particle with mass. Like us – we're pulled down by gravity. A magnetic field attracts any moving charged particle. Like an electron. If an electron is moving through space and encounters a magnetic field, it will feel a force – “magnetic” force – pulling it in a certain direction.

INSPECTOR

Why?

MARTIN

Oh, this is fundamental stuff. It just *is*. We look at the world and notice how it behaves. We try to explain *how*, not why. “Why” is philosophy. Or religion.

INSPECTOR

Why is religion? So the bible explains why a magnetic field pulls electrons around? I never picked up on that. You sure have to read between the lines with those religious texts, don't you? (*Pause*)

BEATRICE

Er, .. so you can kind of think of a solenoid as a magnet, if supplied with current.

AMANDA

There's one in the e&m lecture hall, right inside the podium. It's pretty cool. Professor Weinstraub likes to use it for demos. It's pretty easy to work, it's got a remote control that does everything for you.

INSPECTOR

How exciting. All right, everyone. Why don't you go and chat amongst yourselves in the back, while Beatie and I have a little discussion.

(AMANDA, MARTIN, STUDENTS, WEINSTRUB, FLETCHER walk to back and whisper together, ignoring conversation between INSPECTOR and BEATRICE.)

We don't seem to be getting anywhere with these slides, Beatie. There's too many concepts here for the killer to have been worried about us singling out just one. Let's change tactics. We'll keep this stuff in mind as clues, but let's consider the suspects. Anyone who had the opportunity to knock off Professor Rosen.

BEATRICE

Sure, sounds good.

INSPECTOR

We've got Amanda Palmigiani, who seems to have known the late Professor Rosen on more than academic terms.

BEATRICE

Why do you say that?

INSPECTOR

She kept accidentally calling him Sam.

BEATRICE

So?

INSPECTOR

Well, did you call your physics professor Sam?

BEATRICE

No.

INSPECTOR

I rest my case.

BEATRICE

His name was Quincy.

(Pause)

But with me he preferred "Sugar Cakes."

(Pause)

But anyway, Amanda Palmigiani claims not to have known about the demo today.

INSPECTOR

That's true. The only person who knew how the demonstration would go was Martin van Cork, who set it up alone.

BEATRICE

Amanda did know that the entire lecture series was on the power point. Martin didn't.

INSPECTOR

True. True.

BEATRICE

What about the students? There was some contact between the professor and a few students before lecture began.

INSPECTOR

That's right. Jessica Dee, the one who's related to him. She gave him a glass to drink. He drank some from it shortly before the lights went out.

BEATRICE

Do you think something was in the glass?

INSPECTOR

Water.

BEATRICE

Besides water.

INSPECTOR

Ah, yes. Possibly poison.

BEATRICE

Possibly poison?

INSPECTOR

Yes. Do you recall that she left to take her medication? That container was brimming with capsules when she left; it was nearly empty upon her return. Now, I don't know anyone, no matter how psychotic, who takes twenty capsules in one dose.

BEATRICE

Seargent Daniels takes eleven.

INSPECTOR

Seargent Daniels is in a class of his own. Now, we need to find out what that medication was, and what happened to all those capsules.

BEATRICE

I'll get on it. Now, someone else came down. Another student. She handed him a paper.

INSPECTOR

Ah yes, the early problem set. From Charity Coom. The desperate one who needs a good grade.

BEATRICE

I recall she was holding it quite carefully at its edges; didn't touch what was written on it. It could be that she just wanted to keep it in pristine condition and not smudge anything.

INSPECTOR

Yes, could be. Could very well be. Or, could be she didn't want to touch the paper because there was something on it.

BEATRICE

Ink.

INSPECTOR

No, something in the ink. Like poison.

BEATRICE

Oh, poison.

INSPECTOR

Yes, poison. (*Dramatic pause.*)

BEATRICE

What about Weinstraub, the professor from across the hall?

Armstrong / *Fatal Fundamentals of Physics*

INSPECTOR

Doctor Athanius Weinstraub. He came in here quite befuddled, searching for ... something.

BEATRICE

I think it was his students.

INSPECTOR

Right. But he rummaged around for a bit. In the podium. For ... chalk, did he say?

BEATRICE

That was it.

INSPECTOR

Or so he said. Let's examine this podium.

(INSPECTOR and BEATRICE move to podium, open door.)

Nothing interesting. Ms. Palmigiani and Mr. van Cork, care to come over here for a moment?

(AMANDA and MARTIN join them.)

Is everything in this podium as it should be? Anything unusual inside?

MARTIN

No, nothing I can see. *(Pause.)* That's weird.

INSPECTOR

What's weird?

MARTIN

Oh, nothing. Doesn't matter.

INSPECTOR

What's weird?

MARTIN

Well there's nothing unusual in here, but there is something missing. At least, I *thought* it was here. But I guess I must have left it in the office.

INSPECTOR

What's missing?

MARTIN

Well, I think a syringe. Rosen borrowed it from the chem department. It's for next month's fluids and pressure demo.

INSPECTOR

Can you describe this instrument?

MARTIN

It's a just syringe with a long stainless steel needle. 7-gauge – the longest they make. It's about 6 inches long. He thinks it's cool for fluids demos. The students like it; they think it's creepy-looking; like out of some bad horror movie. I thought I'd put it in here.

INSPECTOR

Is it durable?

MARTIN

Durable?

INSPECTOR

Could it penetrate thick tissue without breaking?

MARTIN

Um. Yeah, I'd say so. Rosen dropped a ten-pound rock on it once in his office, when it was standing vertically. It didn't break.

INSPECTOR

Why did he do that?

MARTIN

I think he was bored.

INSPECTOR

Ah. *(Pause)* Mr. van Cork, it strikes me as unusual that such a potentially dangerous instrument would be lying around in an unlocked drawer. Do you find that odd?

MARTIN

Uh. No.

AMANDA

It's not a big deal. I know in this culture of super-safety-ness, everything's supposed to be dangerous. You're supposed to wash your hands three times before eating anything. But this is a physics department. We're rational. We try to be responsible and people don't get hurt.

INSPECTOR

People don't get hurt, eh?

AMANDA *(Considers)*

Well, *most* people don't get hurt.

INSPECTOR

Thank you both. That's all I need from you for now.

INSPECTOR (cont'd)

(*AMANDA and MARTIN walk to back. To BEATRICE.*)

So. A large syringe is missing from the podium. Did anyone besides Professor Weinstraub open the podium door before class today?

BEATRICE

I didn't notice anyone.

INSPECTOR

This gets complicated. Van Cork is a suspect as well, so we can't entirely take his word for it that there was ever something there. Perhaps he's trying to divert attention from himself.

BEATRICE

Amanda didn't disagree with him.

INSPECTOR

True. Now I remember, Professor Weinstraub didn't seem to even think that Professor Rosen would be in here today.

BEATRICE

No ... he didn't *seem* to think.

INSPECTOR

True.

BEATRICE

What about Chadwick Fletcher, Dean of Student Affairs? He knew.

INSPECTOR

Yes, he was evidently slated to give the introductory address.

BEATRICE

Do we have anything on him, regarding Rosen?

INSPECTOR

He knew that the professor wore a pacemaker.

BEATRICE

That's right.

INSPECTOR

Could have been carrying a magnet or something on his body that'd interfere with it.

BEATRICE

But he asked Amanda Palmigiani whether the professor had prepared something special for lecture, so he didn't seem to know about the demo, or that the lights would go out. He wouldn't have known he'd have an opportunity to get close enough without being suspect.

INSPECTOR

Hm. Were there any more students?

BEATRICE

There was the one crazy genius kid who asked about quantum mechanics. But I don't think he ever came into direct contact with the Professor.

INSPECTOR

Ah yes, him. He's an inventive sort, though. Might have devised some method so crafty that he could have pulled off the murder from a considerable distance. Without leaving his seat. But as of now I can't see how. So far all we have established is that each suspect had opportunity. But we have yet to establish any motives or means.

BEATRICE

The motives might take a little research. As for means, I think we've already got some ideas to work with from this lecture.

INSPECTOR

Means .. physical means?

BEATRICE

Exactly.

INSPECTOR

Beatie, you're way over my head. I couldn't solve the Monday crossword without you. Lucky for me, in the end I get all the credit. Why don't you work on the physics of means, while I go dig up some dirt on these characters.

BEATRICE

Sounds good, Eddie.

INSPECTOR (*To Class*)

All right everybody, we're going to take a little break. Say 15 minutes. Take a walk around, stretch, talk to those characters in the back

(referring to SUSPECTS. To SUSPECTS)

You all back there, I don't want you leaving this building. Use the restroom if you need to, but do not set foot outside. Yeager and Kaye will be watching you. See you all back here in 15.

ACT II

At Rise: ROSEN's body, problem set, Styrofoam cup have been removed. Body outline has been taped down during intermission. All SUSPECTS are present.

INSPECTOR (*At podium; to Class*)

All right, everyone, it's time to begin a closer examination. We've discovered some illuminating information about each of you, and we'll go over it together. Let's start with Mr. van Cork. Mr. van Cork, care to step down here?

(*MARTIN approaches podium.*)

Mr. van Cork, you set up the demonstration today, did you not?

MARTIN

Yeah.

INSPECTOR

Did anyone besides you know what it involved?

MARTIN

No.

INSPECTOR

In the demonstration setup, it says that there needs to be a mat on the floor. Why is that?

MARTIN

Professor Rosen stands on top of the desk to do the demo. The mat is there as a precaution.

INSPECTOR

Why wasn't it there today?

MARTIN

It wasn't where I've found it before, and I didn't have time to go looking before class started.

INSPECTOR

Wasn't that a violation of safety regulations?

MARTIN

Look, Rosen had to have seen that the mat wasn't on the floor. He didn't have to do the demo if he didn't feel safe.

INSPECTOR

I see. Heartwarming how you scientists all look out for each other. Now, who turned the lights off at the start of the demo?

MARTIN

Me.

INSPECTOR

Did you know the Professor would ask for the lights off?

MARTIN

He asks for the lights off at the start of every demo he ever does. He thinks he's dramatic.

INSPECTOR

And did you know that he had his entire lecture series on power point?

MARTIN

No.

INSPECTOR

All right, Mister van Cork. So. You're about to graduate, eh?

MARTIN

Yeah.

INSPECTOR

Congratulations.

MARTIN

Thanks.

INSPECTOR

And you've applied for a job at the prestigious Joseph Bell Institute for Engineering.
(Pause)

MARTIN

(Suddenly wary as he realizes he's been researched)

Yeah, that's right.

INSPECTOR

They've got quite an intimidating application process. Says you need at least three letters of recommendation. You've submitted two out of the three. One from Athanius Weinstraub, your former Electricity and Magnetism professor, another from Larry Jasper, the owner of the Exxon gas station on Carmel Street across from campus.

BEATRICE

You asked an Exxon gas station owner to write your recommendation?

MARTIN

He's gifted in classical mechanics. We talk shop sometimes. He finds my wealth of theoretical knowledge impressive and applicable in a real-world setting.

INSPECTOR

But you have yet to submit the third and final letter. Where do you intend to get it? The deadline is quickly approaching.

MARTIN

I was intending to get it from Dr. Rosen. But I guess you already know that.

INSPECTOR

And did you?

MARTIN

No.

INSPECTOR

Why not?

MARTIN

He wouldn't write it.

INSPECTOR

Why not?

MARTIN (*Sigh*)

Shit, I dunno, it was an issue over my grades this last semester.

INSPECTOR

How did that make you feel, Mister van Cork?

MARTIN

If you're suggesting I killed him because of a stupid letter of recommendation, you're insane. How would that have helped me get a job?

INSPECTOR

Probably wouldn't have. Then again, anger has a funny way of masking logic. May I suggest the following. You knew precisely how the demo would occur; you'd set it up. Professor Rosen would climb up on the desk

(climbs up on desk)

and drop two objects from the ground, demonstrating the uniform acceleration of gravity: that in the absence of air resistance, two different masses fall at the same rate

(demonstrates this with whatever is at hand. Jumps down, goes to slide they had discussed earlier.)

INSPECTOR (cont'd)

Now, as Ms. Palmigiani aptly explained earlier, the time it takes an object to fall can be found by this expression: $x = (1/2)gt^2$, where x is the distance fallen, g is the uniform acceleration of gravity at the earth's surface, and t is time. Moving things around a bit, we have $t = \sqrt{2x/g}$, which yields a little more than one second. Say 1.2 seconds.

Then, the velocity he has attained by the time he impacts the ground, is g times that time: $9.8\text{m/s}^2 \times 1.2$, which is about 10 m/s, or 25 ft/s, or .005 miles/s, or 18 miles/hour. If he'd landed on his head at this speed, it could have been fatal. Especially if it was someone frail to begin with. Someone younger and strong, fully knowledgeable of the professor's movements, and safely cloaked in darkness, could have arranged for such an "accident" to occur.

MARTIN

Shit, that's a kick-ass idea. I didn't do it, but I totally could have pulled it off.

INSPECTOR

That's what you have to say for yourself? You didn't do it? That's it?

MARTIN

Why argue? You know I had the opportunity. The motive's lame and the method would have been risky. I didn't do it. What else do you want me to say? You want me to get down on my knees and beg you to believe me? Fuck that shit, man. I'm not groveling to some freak with a swollen ego.

INSPECTOR

All right, I won't press my luck here. How about anyone out there? Anyone have questions for Mr. van Cork here?

(Questions)

Thank you, Mister van Cork. Ms. Palmigiani, care to step forward?

(AMANDA steps forward.)

Ms. Palmigiani, you were heard a few times earlier in the day addressing Professor Rosen as Sam. May I enquire as to the nature of your relationship with him?

AMANDA

We were good friends.

INSPECTOR

Good friends. Just good friends?

AMANDA

Yes. Just good friends.

INSPECTOR

Ah. Then, perhaps you might explain ... these?

(Whips out a pair of lacey panties.)

INSPECTOR (cont'd)

We found these underneath one of the seat cushions of the couch in Professor Rosen's office. I have cause to believe they belong to you.

AMANDA

Well, they don't.

INSPECTOR (*Reading panties*)

"Amanda Palmigiani. (917) 428-2431."

(*Pause.*)

Care to reconsider your statement?

AMANDA

Okay, so we were *very* good friends. So what? It was over, anyway.

INSPECTOR

That's right, he ended it, didn't he? Quite recently, in fact.

AMANDA

Yes.

INSPECTOR

And how did that make you feel?

AMANDA

How do you think it made me feel?!

INSPECTOR

Distraught. Definitely distraught. Perhaps distraught enough to devise his demise. May I suggest that, upon hearing that there would be a demonstration today, hurt by the fact that he hadn't asked you to help set up – which reminded you suddenly of his coarse refusal to accept your love, support, and admiration – suddenly snapped? This was your chance to end things. Mister Van Cork here has said that the lights traditionally go out before every demo. Being his TA, you knew this. So upon hearing there would be a demo, you realized that the room would be plunged into darkness for a few moments. Now, ordinarily someone of your size would have a difficult time inflicting injury on a person much larger than herself. But as we reviewed earlier, the martial arts endow a skilled student with considerable power. You are aware of this?

AMANDA

Of course I am, I have a third degree black belt. That doesn't mean I would use it to hurt someone.

INSPECTOR

Not necessarily, no. But it is possible. The martial arts take advantage of various physical principles. For example, Newton's first law, relating the acceleration of an object to the force it can exert:

(Writes "F=ma" on board.)

Force equals mass times acceleration. In karate, the faster you throw a punch, or a kick, the greater a force you exert. An expert can take advantage of this principle to break a block of cement in half. A blow like that to the torso would knock the wind out of a victim, at least temporarily. A blow to the head or neck could do worse.

AMANDA

Yes, it could. But I didn't –

INSPECTOR

The physics of rotation is also crucial in the understanding of how the martial arts work. The apt application of torque. Torque is kind of like a rotating force. To push a block across the floor you apply force. To swing open a door you apply torque. Or, say, to rotate a person's head in such a way that his neck snaps in two.

(Getting into it)

Or, say, to flip a person over your shoulder in such a way that he bashes his skull on the floor.

(Really getting into it)

Or, say, to rotate your own body in such a way to put such power into your scissor kick to the stomach that it causes devastating internal bleed –

BEATRICE

(Noticing AMANDA's and other witnesses' squeamish, horrified looks)

Er, Eddie, I think they get the idea.

INSPECTOR

I'm simply illustrating that someone versed in the simple laws of rotational mechanics could easily have taken advantage of them.

AMANDA

(Unable to hold back any longer)

How could you say that?! I LOVED him! I loved him, I couldn't have done that. I *couldn't* have done that – it's not so easy as you say it is. Doing something so extreme is really hard, even if you're skilled.

INSPECTOR

So you've explored the technique.

AMANDA

Of course. Safety training is an important part of a martial arts class. Making people appreciate how powerful they can be, and to *avoid* certain moves. But I didn't do this! I wouldn't! I loved him more than anything in the world.

INSPECTOR

Love can meet with a bad end sometimes.

AMANDA

And why would I do it in here, in front of 100 people when the lights could come back on any second? Why wouldn't I just have done it in his office when we were alone?

INSPECTOR

Ah. So the thought had occurred to you, then?

(AMANDA is silent.)

BEATRICE

Well, it's true, she couldn't have been sure the lights wouldn't come back on in a second. It was risky.

AMANDA

I didn't do this! I didn't.

INSPECTOR

Does anyone have questions for Ms. Palmigiani here?

(Questions)

All right, Ms. Charity Coom, will you come up here, please.

(CHARITY approaches.)

Ms. Coom, you handed the Professor the first problem set shortly before he died. Care to explain to me why you were handing it in so early?

CHARITY

I just really really need to do well in this course. I'm going pre-med, so I need this credit. I'm not good at it, I'm actually pretty terrible. So I thought I'd try to get ahead.

INSPECTOR

I suppose that, given your extreme paranoia about your grade, a week early isn't unreasonable. But we noticed that you took great care in not touching the ink when you handed it to him. Care to explain why?

CHARITY

I didn't want to smudge it. I'd worked so hard.

INSPECTOR

Ah. Ms. Coom, pre-med students take courses in all the hard sciences including chemistry, is that correct?

CHARITY

Yes. I'm taking chem now.

INSPECTOR

The lecture is accompanied by a lab experiment once a week, correct?

CHARITY

Yes.

INSPECTOR

This is the end of the first week of classes. So you have had your first lab.

CHARITY

Yes. Yesterday.

INSPECTOR

Would you mind explaining to us what it consisted of?

CHARITY (*Pause*)

Uh ... I'm afraid my stupidity isn't confined to physics, Inspector. I'm terrible at chemistry too. In fact I'm kind of starting to question my whole cardiac surgeon plan.

INSPECTOR

If you're having trouble recalling, allow me to fill everyone in for you. Ms. Coom's first lab session was a simple standard overview of laboratory safety procedures. No experiment took place; rather a tour of the lab and its contents. (*Pause*) You don't remember this, Ms. Coom?

CHARITY

I ... I .. well, I guess I wasn't paying too much attention, to be honest.

INSPECTOR

The safety lecture focused, naturally, on the worst dangers that the lab contents could pose. The professor demonstrated proper use of protective gear, showed them how to operate the water fountain to flush eyes and clean skin, and then went on to point out specific items to avoid. Do you remember this, Ms. Coom?

CHARITY

Oh, I remember the water fountain. It's neat-looking – it's more like a shower, it's big enough to stand in. It's got a shiny bright yellow paint –

INSPECTOR

On an unrelated note, the chemistry laboratory was ransacked yesterday evening after class. The cabinet that stores the more potent chemicals, which is always kept locked,

INSPECTOR (cont'd)

was broken into. Among other things, a vial of dimethyl mercury is missing. Ms. Coom, having heard the safety lecture, can you tell us what dimethyl mercury is?

CHARITY

Mercury? Like in a thermometer?

INSPECTOR

(Regards her skeptically)

You don't remember any mention of dimethyl mercury during the safety lecture?

CHARITY

Um. No.

INSPECTOR

Allow me to educate you. Mercury is a naturally-occurring neurotoxin. It comes in various forms, some more potent than others. Dimethyl mercury is the most dangerous. A lethal dose can be ingested by the slightest physical contact: smelling the fumes, or spilling a drop on the skin. In the latter case, the poison seeps through the skin via capillary action. Even if the victim is wearing latex or neoprene gloves, the substance seeps directly through and causes nearly instant death. Does any of this jog your memory, Ms. Coom?

CHARITY

Um. No.

*(Defensive, thinking she's being accused of a poor attention span.
The idea that she's a murder suspect has still not occurred to her.)*

Look, he went on and on for an hour about all that danger stuff. It got really boring. I just stopped paying attention.

INSPECTOR

You stopped paying attention.

CHARITY

That's right. And my nails needed filing anyway.

INSPECTOR

Just like you stopped paying attention the last time you took this course with Professor Rosen at his home institution of Princeton last spring, Ms. Coom? Is that why he failed you? *(Pause)*

CHARITY

I don't see why you have to bring that up. I worked really, really hard in that class. I didn't deserve to fail.

INSPECTOR

You didn't deserve to fail? And did Professor Rosen deserve to get handed a problem set written in ink that was tainted with dimethyl mercury?

CHARITY

(Suddenly realizes his implication)

Wh – what?! You think I would do that – because he failed me in a class?!

INSPECTOR

I'm merely raising the possibility. You've already taken this class. Why have you shown up again?

CHARITY

Because I need it! I need the credit to graduate! I have one semester left, this is my last chance. That's why I handed the problem set in early – I want to stay ahead this time around. I wasn't trying to kill him! Give me the problem set. Where is it? Give me it, I'll show you, I'll touch it. I'll touch it a million times.

INSPECTOR

How convenient for you that it has already been sealed in an airtight bag and sent off to forensics. But you probably imagined we'd done that, didn't you? You're not as dumb as you act.

CHARITY

No! No, you can't take it away! It's due next Thursday! Please! Can't I at least photocopy it?

INSPECTOR

All right, all right, let's not get hysterical. Students, any questions for Ms. Coom here?
(Questions)

INSPECTOR

All right. Mister Chadwick M. Fletcher, may I see you up here for a moment, please?

FLETCHER

Why, certainly. And it's *Doctor*, Inspector.

INSPECTOR

My mistake. Now, Doctor Fletcher, I hear that you were up for the same distinguished position that Professor Rosen won this year. In fact, you were originally slated to fill the position, until Professor Rosen returned unexpectedly early from his trip to Nantucket and was able to accept the award.

FLETCHER

Yes. Well, he won. I'm a professional, I hold no grudges.

INSPECTOR

No grudges. Not even over a \$300,000 sum that came along with the two-semester teaching position? Your research team has been pinching pennies lately, I hear. An extra \$300,000 would feel pretty cozy. Am I right?

FLETCHER

Certainly additional endowment is always welcome. But not over a dead man's body.

INSPECTOR

Over who's body, then?

FLETCHER

I beg your pardon?

INSPECTOR

Forget it. You were aware that the Professor wore a pacemaker, am I correct?

FLETCHER

Yes.

INSPECTOR

I have read recently about a danger that common gadgets pose to wearers of pacemakers; magnets, for example. Magnets nowadays are found everywhere: microcomputers, even jewelry. Now, the heart is an electrical system; a pacemaker works by providing a life-saving jolt of voltage if it senses that the body's natural electrical system is faltering. If the device encounters an outside magnetic field or strong current, however, its settings can be interfered with. Even if the device is a foot or so away from the source of interference.

FLETCHER

Yes, I have heard that. What do you insinuate?

INSPECTOR

Merely that with your knowledge of the Professor's pacemaker, you could have engineered a murder that had the appearance of a heart attack. In the darkness, armed with a magnet or a contraption that produced a strong current, you could have generated a potentially strong nonuniform magnetic field. You only had to approach the professor within a couple feet ... and he would conveniently have a heart attack. There would be no mess; in fact no apparent physical contact whatsoever. You'd have plenty of time to return to your seat.

FLETCHER

That is preposterous slander, Sir! Besides, I didn't even know there was going to be a demonstration with the lights off. I couldn't have come down there and done anything if the lights hadn't gone off.

INSPECTOR

True. That appears to be true enough.

(Pause. Turning to MARTIN and AMANDA)

I do have this right, though, don't I? That's what Maxie's Equations tell us – that a current can produce a changing magnetic field. Bad news for a pacemaker.

MARTIN

Maxwell's Equations. But yeah, that's right.

INSPECTOR *(To Class)*

Does anyone out here have questions for Mister FI –

FLETCHER

Doctor FI –

INSPECTOR

Doctor Fletcher?

(Questions.)

All right, Ms. Jessica Dee. Are you here?

JESSICA *(Advances)*

Yes.

INSPECTOR

(Consulting notes)

“Gave Professor a glass of water before class.” *(Looks up; to JESSICA.)* That's right, you're quite the accomplished little brown-noser, aren't you?

JESSICA

Oh – oh, that. Well, I just wanted to be helpful. He was coughing.

INSPECTOR

Very thoughtful of you, Ms. Dee; no one's doubting that. Now, you had to go out anyway, to get water for yourself, is that right?

JESSICA

Yes, that's right. I needed to take my medication.

INSPECTOR

Now, you returned with a Styrofoam cup of water from the fountain. Why didn't you go to the vending machine and buy him a new bottle? Ms. Palmigiani had told you that it was just across the hall.

JESSICA

Oh, that's just a waste of money.

INSPECTOR

Waste of money. Paying for water. You have a point. Well, would you kindly tell us what medication you were taking?

JESSICA

Oh, well, that's private.

BEATRICE

Not anymore, Sweetie.

INSPECTOR

A little poking around at Student Health Services informed us that you were diagnosed with an anxiety disorder last spring. You are prescribed Doriden – a barbiturate that relaxes and calms you. I can see the marked change in you since you exited the room for water – you do seem much more lucid.

JESSICA (*Reluctantly*)

It helps a great deal.

INSPECTOR

That's wonderful. It's important to look after your health.

(*Going to blackboard*)

A barbiturate, as you probably know, works by depressing the GABA receptors in your central nervous system. GABA is a neurotransmitter that is believed to regulate mood. The receptor is the entrance to the route the neurotransmitter must take to its location of use. Now, a deficit of GABA is linked to depression. Barbiturates can bind to the GABA receptor and essentially behave as "extra" GABA, thereby supplementing the brain's supply – aiding in mood stabilization. Barbiturates also *block* another neurotransmitter – AMPA – which is linked to excitation.

BEATRICE

So, basically, barbiturates help the calming agents and inhibit the excitatory agents at the same time?

INSPECTOR

Exactly. And they are quite effective and safe, so long as you don't overdose, or your constitution is not especially sensitive to them. Overdosing or oversensitivity can cause too much relaxation – slowing the heart – and in some cases even stopping it. (*Pause*)

BEATRICE

Impressive.

INSPECTOR

I took neuroscience last semester.

BEATRICE

The lab too?

INSPECTOR

I went ... once. (*Pause.*) I just couldn't do ... *that* ... to a mouse. You know? A rat, maybe, but not a cute fuzzy little mouse.

(*Temporarily overcome with emotion; recovers. To JESSICA*)

Now, Ms. Dee, undoubtedly your doctor has cautioned you about the dangers of overdose?

JESSICA

I don't see how my conversations with my doctor are anyone's business.

INSPECTOR

When there's a murder, everything becomes everybody's business, Miss.

JESSICA

He mentioned it, several times, yes. He's a thorough, caring man.

INSPECTOR

When you headed out for water, that container of yours was full of capsules. When you returned, it was nearly empty. Clearly you didn't overdose – you're still alive and well. Care to explain their disappearance?

JESSICA

Oh, that. I was in a rush. I managed to take my pill, but I tripped, and I spilled the others. I cleaned them up, and the janitor was passing by with a garbage can; I put them in there.

INSPECTOR

But you returned so quickly.

JESSICA

Okay, well, the janitor actually cleaned them up for me. He offered. I felt badly because it was my fault, but I didn't want to miss any of Professor Rosen's lecture.

INSPECTOR

All right, Ms. Dee. Moving on – how do you know Professor Rosen?

JESSICA

Oh, he's my uncle. *Was* my uncle. Or, really, my step-uncle, or second-uncle, or whatever you call it. He was my aunt's husband.

INSPECTOR

A close family member?

JESSICA

Oh, yes. Well, he doesn't really know me very well, but he's incredibly close to Dad.

INSPECTOR

To your father?

JESSICA

That's right.

INSPECTOR

Must have been, to have left him such a significant fraction of his wealth to your parents in his will.

(Pause)

JESSICA

Well, I can't understand how you know about that, but yes.

INSPECTOR

Awfully generous of him. It'll be a comfy change in your family from now on, I imagine. You won't have to pinch pennies anymore.

JESSICA

Pinch pennies?

INSPECTOR

Seems to me, someone who won't buy a one-dollar bottle of water for a dear relative, is pinching pennies.

(JESSICA is silent.)

I overheard you mentioning a hospital stay of his.

JESSICA

Yes, that was the last time I saw him. He was in for almost a week.

INSPECTOR

Why?

JESSICA

He'd ... OD'd on something.

INSPECTOR

Overdosed.

JESSICA

Yes. I don't remember how.

INSPECTOR

Overdosed is not quite accurate, is it, Ms. Dee? In fact, he took the normal prescription dosage of a new sleeping medication, no more, no less. But unfortunately his body has a natural aversion to the medication, and within a few hours of ingesting it he suffered a near fatal reaction. It was called Equanil – a type of barbiturate. Isn't that right?

(Pause)

JESSICA

I think so, actually. I had forgotten.

INSPECTOR

Yes, these things do tend to slip one's mind, don't they. Things like forgetting that your uncle nearly died from a normal dosage of generic sleeping medication, and that any future encounter with such drugs may prove fatal. No need to hang onto such inconsequential details of daily life, eh?

JESSICA

I – I was just glad he got better; I hadn't paid attention to all his tedious medical information.

INSPECTOR

So. Ms. Dee. You, then, did not intentionally choose to give your uncle a Styrofoam cup as opposed to a bottle, to avoid the suspicion that might be aroused if the bottle cap were already untwisted? And you did not dissolve a few capsules of your prescribed Doriden into the Professor's water cup – the capsules that were nearly entirely gone when you returned to this room?

JESSICA

Of course not! What a horrible, horrible, horrible thing to suggest! That's just – it's .. it's ... it's *horrible!*

INSPECTOR

All right, I get your general drift. Any questions for the young lady here?

MARTIN

Jesus man, she's crying. Give her a break, will you? What kind of a person are you? You've got a motive for everyone in this room. No matter how far up your ass you have to pull it from.

INSPECTOR

In a murder investigation, everyone is suspect, Mr. van Cork. There's no room for being sensitive and considerate when a dead man's lying on the floor.

AMANDA

Well, I don't see him.

BEATRICE

We moved him.

MARTIN

So everyone's a suspect, huh? How about you and your little assistant there? How do we know one of you didn't do it?

INSPECTOR (*Laughs*)

Me? I don't know anything about physics!

MARTIN

Oh, that's right, then you couldn't possibly have done it. I wonder, do you s'pose Jeffrey Dalmer knew anything about physics? How about Ted Bundy? What about the Mafia families, you think they take night classes?

INSPECTOR

All right, van Cork, I appreciate the humor. Thoughtful of you to lighten the mood. Take a seat, please.

(*MARTIN grumbles but sits.*)

Questions for Ms. Dee, anyone?

(*Questions*)

Thank you, Ms. Dee. Mister Felix Kagynsky, will you please step forward?

(*FELIX steps forward.*)

You had a few complicated questions for the Professor before the show, didn't you?

FELIX

Yes, it's rather embarrassing as it should be such a trivial matter. But I was experiencing difficulty in translating between Dirac notation and integral form, and suddenly I realized that the idea of a Hermetian operator was no longer so clear to me. I worked through the proof a second time, but the precise meaning –

INSPECTOR

Yes, thank you Mister Kagynsky. Now, you learned this course, Fundamental Concepts in Physics, over what – your summer vacation?

FELIX

Actually I completed this text in the third week of June. I had several areas of study to which to relegate the summer; I needed to wipe this one from my slate first.

INSPECTOR

And you've since advanced to graduate-level material. Mark of a genius, I'd say.

FELIX

Thank you.

Armstrong / *Fatal Fundamentals of Physics*

INSPECTOR

A genius with ulterior motives, perhaps?

FELIX

I beg your pardon, Sir?

INSPECTOR

Mr. Kagynsky, are you not a member-in-good-standing of the Yeager W. Alan Society?

FELIX (*Startled*)

You're quite the resourceful detective, aren't you?

INSPECTOR

Is that a yes?

FELIX

If you like.

INSPECTOR

Can you describe to us the mission of the Yeager W. Alan Society?

FELIX

Certainly. We aim to ensure that all youth in this country have access to equal educational opportunities, independent of their financial income.

INSPECTOR

That's some handy paraphrasing, Mr. Kagynsky. Your organization's website is more specific.

(Reading from notes)

"Privatized education is a soulless, godless, elitist practice, dedicated to intentionally broadening the chasm between rich and poor. Privatized education markets the promise of bright futures in neat glossy four-year packages to those who can afford the price tag, while callously ignoring those who need it most, thereby maintaining the ignorance of the poor, and either 1) condemning them to a bleak and humble existence pushing dope in the South end of Boston, or 2) to one semester at a public community college where they shall unavoidably fail their classes because the teachers never bothered to show up because they were gunned down at point-blank range on their way to lecture, and so dropped out and *then* started pushing dope in the South end of Boston. Privatized education, its funders, aiders, and abettors, must be destroyed, destroyed entirely, beyond the possibility of recognition, with the employ of any and all means possible." *(Pause)* Is this the mission statement that you summarized, Mr. Kagynsky?

FELIX

It does ring as rather crass, doesn't it? Well, I assure you, what our webmaster lacks in eloquence he makes up for in technical capabilities.

INSPECTOR

It has a threatening ring to it.

FELIX

Inspector, he is our webmaster, not our Poet Laureate. If you spent twelve hours every day alone in an 80-square-foot basement closet with fluorescent lighting, a carpet that smells like old milk, and routinely downed three cups of excruciatingly acidic coffee before ten a.m. each morning, you would likely threaten anyone you had ever heard of.

INSPECTOR

Mr. Kagynsky, do I take that statement to constitute a denial that you belong to an organization that harbors ill will toward private schools and universities?

FELIX

I do not deny it. But I suspect that you suspect my motivations to be not what they are in reality. I joined for the free laser pointer.

INSPECTOR

The free laser pointer?

FELIX

(Removes laser pointer from his pocket.)

Yes. It is the latest on the market. Its uses are more numerous than I had even expected. I am not embarrassed to state that I find it utterly delightful.

INSPECTOR

Uh huh. Mr. Kagynsky, Let me ask you whether the following scenario might be possible. You, a dues-paying member of the Yeager W. Alan Society, enter a classroom in a small private university, taught by prestigious Ivy-League-educated Professor Samuel T. Rosen. Equipped with your state-of-the-art laser pointer, your sharp, conniving intelligence, and your organization's evil intent to destroy, you enact his death from the comfort and safety of your lecture hall seat. Aiming your laser pointer to activate the light-sensitive battery on the Professor's pacemaker that he wore underneath his clothing, you effect his instant death without having to take the slightest incriminating step in his direction.

(Pause.)

FELIX

Not that I would be psychologically constituted for such atrocious behavior, but it would not be physically possible. Pacemaker batteries, or any batteries for that matter, operate via the flow of electrical charges – as Amanda Palmigiani explained to you earlier. Photons, which are particles of light, are neutral. Charge-less. They would have no effect on the functioning of a battery.

(INSPECTOR appears confused. Looks to BEATRICE for confirmation. BEATRICE nods, shrugging, as if to say, "Sorry, he's right.")

AMANDA

How would he even have known *where*, under his clothes, Professor Rosen wore the pacemaker?

INSPECTOR

(Disappointed but recovering quickly.)

Ah. All right, then. All right. Mr. Kagynsky. May I suggest that with the use of your powerful laser pointer, you took advantage of the darkness to quickly steal down to the podium and shine the light into Professor Rosen's eyes – causing the poor frail old man's pupils to dilate so rapidly, so extremely, that the blood vessels within them began hemorrhaging, and, due to their proximity to the brain, soon led unavoidably to subarachnoid hemorrhaging nearly instantaneously.

(This has been delivered quite dramatically. Pause.)

FELIX

Inspector, with all due respect, a remedial anatomy lesson will teach you that while both structures are located within the skull, those controlling vision are sufficiently far from the brain so as to render them incapable of affecting each other in so direct a manner. A laser directed in the eyes may cause blindness but certainly not death.

(Pause)

MARTIN

How would he have known the lights were going to go out, anyway?

CHARITY

And wouldn't we all have seen the laser pointer go on in the dark?

(Various voices of agreement with CHARITY and MARTIN.)

INSPECTOR

(Growing frustrated; bent on finding SOME way to use his newly found science knowledge to create a possible means for Kagynsky. He's so-far nailed the other suspects; doesn't want to break the streak!)

All right. All right. Mr. Kagynsky. May I suggest. *(Pause)* ... That this state-of-the-art laser pointer, or so you call it, also happens to be a cleverly disguised syringe when the bulb cap is unscrewed. And that inside is contained a lethal dose of strychnine, which you swiftly plunged into the victim's jugular upon the dimming of the lights, quickly replaced the bulb, and returned to your seat before –

BEATRICE

Oh for chrissakes, Eddie, how'd he have had time to do all that?

JESSICA

Someone would have noticed him standing up.

CHARITY

Do you know what the symptoms of strychnine poisoning are, Inspector? I mean, I didn't tune out *all* of that chemistry lab safety lecture. There's frothing at the mouth, for one thing.

JESSICA

Yes. And twitching muscles.

CHARITY

Yup. Usually. Twitching muscles, lockjaw –

AMANDA

Enlarged pupils –

MARTIN

Protruding eyeballs –

INSPECTOR

All, right, cyanide, then, all right?!?! Jesus, non of you amateurs can see the forest for the trees, can you?

(Determined to redeem himself; to FELIX)

Kindly lend me your laser pointer for a moment, Mr. Kagynsky.

(FELIX does so.)

Thank you. Now, everyone, I see that you doubt the years of experience that have imparted to me

(begins to unscrew laser pointer)

not only impeccable eyes for observation and keen memory for facts, but also a deeper, a keener, intuitive sense – a sixth sense, if you will – that requires no observational evidence, not a word in testimony, not a suspicious aversion of the eyes. It is the sense you develop after you've made so many jagged links of so many mysteries suddenly fall together as a whole. A rare, natural gift that so few others appreciate. And in the end, you find that after you've picked up the pieces –

(cap finally comes unscrewed, letting loose contents of laser pointer fall all over the floor. It is clearly Just a Laser Pointer.)

BEATRICE

... it's just a laser pointer.

(Long pause. No one moves.)

FELIX

Don't feel too badly about it, Inspector. You could have been quite nearly onto something there. For example, had I taken scrupulous note of the geometry of this room and adhered small mirrors in apt locations in the corners near the ceiling where they would be least likely to be noticed, I could have used my laser pointer to bounce light from one to the next until the radiation reached behind the podium – an impossible target to reach on a mere linear line betwixt that point and my seat – and activated a small

FELIX (cont'd)

contraption I had placed there unnoticed before class had begun, which contained a springboard that launched a small dart whose tip was dipped in a rapidly-acting lethal poison originally discovered by Native Americans several centuries ago in the Pacific Northwest. Upon penetrating the Professor's leg, he would have died nearly instantly, and in the confusion during which all rushed to help him, I could have quietly retrieved the dart and its small launch box and stowed them in my coat pocket, unnoticed, as attention was clearly not directed toward me at the moment.

(Pause. Considers)

Oh, yes, I should think I certainly would have been able to pull that off. Rather brilliantly, if I may say so.

(Pause.)

INSPECTOR *(Defeated)*

A likely story. *(Pause.)* Does anyone have any questions for Mr. Kagynsky before we move on?

(Questions.)

Professor Athanius Weinstraub, would you kindly step up here?

WEINSTRAUB

Certainly. Oh, my, certainly, of course. *(Fumbles up to the front.)*

INSPECTOR

Professor Weinstraub, you thought that you were slated to be in this room today, is that not so?

WEINSTRAUB

Yes, Apparently I was mistaken.

INSPECTOR

What were you looking for in the podium drawer?

WEINSTRAUB

I beg your pardon?

INSPECTOR

You were mucking through the podium drawer before class began. Why?

WEINSTRAUB

Oh, I was searching for chalk.

INSPECTOR

Why didn't you wait to get into your own classroom before searching for chalk?

WEINSTRAUB

Well I simply thought that since I was already there I may as well look. Searching two rooms for chalk is likely to be more fruitful than searching just one room for chalk.

INSPECTOR

And did you find any?

WEINSTRAUB

Find any?

INSPECTOR

Chalk.

WEINSTRAUB

Oh! No, I did not.

INSPECTOR

Did you happen to find a 7-gauge hypodermic syringe?

WEINSTRAUB

A what?

INSPECTOR

A long skinny stainless steel syringe with a 6-inch needle protruding from it.

WEINSTRAUB

Why no, I didn't. I believe I would have taken notice of such an object.

INSPECTOR

I imagine anyone would. (*Pause.*) Doctor Weintraub, your field of research is the same as that of the late Professor Rosen, is it not? An advanced course?

WEINSTRAUB

Why, yes.

INSPECTOR

Quantum chromodynamics. In fact, that is the title of your course across the hall, is it not? An advanced course.

WEINSTRAUB

Yes, that's correct.

INSPECTOR

Would you consider the two of you to be collaborators?

WEINSTRAUB

Well, no, not exactly.

INSPECTOR

No, not exactly. Competitors would be more accurate, wouldn't it, Professor Weinstraub? You are both competing for the same NSF grant. Your proposals are due by the end of the week.

WEINSTRAUB

Why, yes, that's true enough.

INSPECTOR

Today you entered the classroom you believed was yours, and were surprised to see your adversary standing there. A few minutes later, in sifting through the podium drawer you came across a potentially dangerous weapon. Perhaps you had a sudden idea – to eliminate the competitive grant problem once and for all. You were familiar with your colleague's style in the classroom. You saw that a demo was prepared, and knew that it was likely that he would turn the lights off for it. You likely knew he had a heart condition, and that a puncture wound to such a sensitive vital organ could prove fatal. Perhaps you waited to see if you might have a chance to act on a virtually unpremeditated whim.

WEINSTRAUB

Why Sir, what an utterly indecorous thing to say. And my wrists are severely arthritic, you know. Why, besides, there is no blood anywhere. Clearly Rosen was not stabbed.

INSPECTOR

No blood anywhere. (*Pause.*) Interesting thing about these instruments, which makes them so useful in medicine. As anyone who's ever had an injection or donated blood knows, the puncture mark on the skin is minute; very hard to see. A long stainless steel syringe can plunge between the ribs straight into the heart, while leaving barely a trace on the skin. And there is very little, if any, blood flow from it once the needle has been removed. Blood is a rather viscous liquid. As we discussed earlier with the balloons, the higher the viscosity of a liquid, the less easily it will flow – especially through a tiny opening. As a physicist, Professor Weinstraub, you understand this. It would have been very possible for you to have punctured a critical organ and, given Professor Rosen's weak constitution, possibly induced a heart attack. If the puncture mark is under his clothes, it'll be impossible for us to know until the autopsy.

MARTIN

Take his clothes off and check, why dontcha.

INSPECTOR

I am sure that I speak for others besides myself when I say that I would prefer not to. Are there questions for the professor here?

(Questions)

INSPECTOR (cont'd)

Well, that's everybody. All right, great. (*Pause.*) I'm baffled. Seems to me each suspect we've got here had opportunity, unique means, and ample motive. Anyone want to help out here? In fact, whoever would like to cast their vote as to the most likely suspect, please do so. Right now. We'll give you a few minutes to think it over, then Beatie here will come around and collect your ballots. How about it? Care to give a hand? Remember, think critically about the physics of each situation. What *could* have happened? Given your newfound understanding of science, what would have been most practical? I know this is your first class, but hey – it's been more instructive than your first problem set would have been.

AUDIENCE VOTES

INSPECTOR

Thanks, folks. Please pass down your ballots so that we can collect them in the front.

(Ballots are collected. To SUSPECTS)

Now, if you all wouldn't mind stepping outside for a minute or so, I'd like to consult with my assistant here.

(Exit SUSPECTS.)

Beatie, let's try narrowing down our options. Amanda Palmigiani, the TA, could have killed Professor Rosen with her knowledge of torque and all that crap. But she couldn't have been confident that it'd kill him; it'd have been real risky, in front of all those people when she wasn't even in control of the lights. I'd say we can tentatively eliminate her.

BEATRICE

I'd say ditto for Martin van Cork, the other TA. He could have made the Professor fall off the desk, but couldn't have been sure that the fall would kill him from a height of only eight or nine feet. Both of them knew too much physics to be that stupid.

INSPECTOR

Right. Now the students. The professor took a sip of that water about ten seconds before he died. Even if Jessica Dee had given him a considerable dose, I doubt it could have acted that quickly. He would likely at least have had time to say something about feeling odd.

BEATRICE

I think you're right, Eddie. And about Charity Coom with the ink –remember, she did try to hand it into Amanda Palmigiani before Professor Rosen got here. She wasn't concerned that Professor Rosen should be the one to receive it.

INSPECTOR

True. Let's rule out Ms. Coom as well. So who are we left with?

BEATRICE

We are left with Athanius Weinstraub: the befuddled professor from across the hall, Mister Chadwick Fletcher: the Dean of Student Affairs, and I suppose Felix Kagynsky: the evil student genius.

INSPECTOR (*Mocking*)

Doctor Chadwick Fletcher.

BEATRICE

Doctor Chadwick Fletcher.

INSPECTOR

Weinstraub at the podium with the hypodermic syringe, Fletcher in the front row with the magnet, or Kagynsky in the audience with the ...

(exchanges a look with BEATRICE, not wanting to be laughed at again)

crazy-physics-genius-brain-that-could-have-thought-up-any-way-in-the-world-to-do-it.

(Pause)

Tough call, Beatie. Tough call. Any impressions?

BEATRICE

Well, it's hard to imagine Fletcher pulling off the magnet thing, because he didn't know the lights were going to go out. And anyway, do you think he'd have had time to jump out of his seat, shove a magnet at the Professor's chest, and run back to his seat before the lights went up? Sounds daring.

INSPECTOR

And Fletcher isn't the daring sort. He's cautious. Conservative. Wimpy. A huge pussy, if you ask me. You've got a point there, Beatie.

BEATRICE

Weinstraub seems too sweet.

INSPECTOR

And Kagynsky seems too clever to put himself at risk. He's the sort who'd hire someone to do it for him. He'd arrange to have an alibi placing him at breakfast in Pakistan at the time of the murder.

BEATRICE

Wanna invite them all back in again? We coulda missed something.

INSPECTOR (*Shouts offstage*)

Yeager, Kaye. Can you send the suspects back in here?

(Enter SUSPECTS.)

INSPECTOR (cont'd)

So. We've narrowed down the suspects. Eliminated some of you, but not all.

AMANDA

Am I eliminated?

INSPECTOR

Yes, you are. Along with your cohort over there. Neither one of you could possibly have pulled it off, and you knew it.

MARTIN

I'm eliminated? That is so lame, man, I totally could have pulled it off. I'm getting my Master's, for crying out loud.

INSPECTOR

It's a compliment, van Cork. You know enough physics to know that a fall wouldn't necessarily have killed him. Even without a mat.

MARTIN

Oh.

INSPECTOR

So don't worry, I'm sure you'll pull your first murder off spectacularly well, when you finally go for it. Mat or no mat.

(MARTIN retorts with a smirk.)

FLETCHER

Mr. van Cork, the mat's always kept in room 210. Along with the chalk.

INSPECTOR

Now, we've pretty much got it narrowed down to three of you. Among those three of you, though, each seems to have a reasonably decent motive, meager means, and not the greatest opportunity. I've gotta admit I'm stuck. I think we'll have to wait for backup to arrive to begin a more thorough investigation. Don't think we can get any further on our own, Beatie. Sorry. The best we can do is keep the suspects here and share the progress we've made when the authorities arrive. ... And Jesus, it's been over an hour. Where in God's name are the campus security?

(AMANDA, MARTIN, STUDENTS snicker.)

FLETCHER

They're campus security, Sir. You mustn't hold your standards too high.

INSPECTOR

Hmph. Well, while we're waiting, I may as well show off my feather-in-a-hat trick. All this fancy physics hooplah is impressive, but as Beatie knows I'm somewhat of an amateur magi — Wait.

INSPECTOR (cont'd)

(Something has occurred to him. To FLETCHER)

What did you say just then?

FLETCHER

I was making a derogatory yet deserved comment about the timeliness of campus sec –

INSPECTOR

No. No, before that. Just a minute ago. After Martin was done complaining.

FLETCHER

Oh – *(thinks)* Oh, well, the young man said he'd had trouble finding the mat. And I merely was helpfully pointing out that the mat has never left room 210 – it's kept there along with the chalk.

INSPECTOR

(Looking at him hard)

This is room 210, is it not? And there is no mat, and, as Weinstraub discovered, also no chalk. *(Pause)*

FLETCHER

Oh, I'm terribly sorry, what I meant to say was room 213. Ha ha, how silly of me. Ha ha!

INSPECTOR

(Still staring at FLETCHER)

Beatrice, go check the room label on the wall outside.

(Exit BEATRICE)

FLETCHER

Oh, there really is no need for the lady to do that, I made a mistake, that's all. I don't mean to cause confusion.

INSPECTOR

Uh-huh. So now I'm finally getting a murky outline of what actually happened here today. Weinstraub entered this room because room 213 has the apparatus he needed for his electricity and magnetism demonstration. Rosen was upset because he'd asked for room 210 – he said he didn't need *this* room, because he didn't need the extra special "frills", as he called them. Both professors know this department and its room locations rather well, but their confusion was ignored. Is there something special about this room?

AMANDA

Room 213 is the e&m lecture hall. Electricity and Magnetism. Or, well, we at least call it that because it's good for e&m demos.

Armstrong / *Fatal Fundamentals of Physics*

INSPECTOR

Why is it good for e&m demos?

AMANDA

There's a solenoid inside the demo table. Remember? I told you before.

INSPECTOR

A solenoid?

MARTIN

Yeah, like the slide you saw.

BEATRICE

(Enter, holding a piece of paper with "213" written on it.)

Eddie, the label came right off. The *real* label was underneath. 210. This is room 210.

AMANDA

Oh! Well that explains it! I was wondering why things had been switched around today.

MARTIN

Yeah, me too, but what did it matter?

INSPECTOR

Thank you, Beatie. *(To AMANDA)* Remind me, how does the solenoid work?

AMANDA

You just activate the current flow, and it generates a magnetic field, and then you can do all kinds of stuff. The students think it's great.

INSPECTOR

And you're telling me it is actually inside *this* table, then?
(Tries to open lid; it won't budge.)

MARTIN

Oh, yes. I guess so. But we don't have the key.

INSPECTOR *(To FLETCHER)*

Fletcher. You were the only faculty member who walked into this room not confused by its number. The students weren't confused *(gesturing to Class)*, but they've never been here before anyway. You knew you were in the electricity & magnetism lecture hall. As Dean, you could have acquired access to its facilities.

FLETCHER

So?

INSPECTOR

And now that I think about it, why would the Dean of Student Affairs be giving an introductory speech for a visiting physics professor? Are you really the appropriate person?

FLETCHER

I'm just as appropriate as any other person.

INSPECTOR

So you invent a reason to be at Rosen's lecture. You divert the entire class to a room equipped to carry out your deadly intentions. And you sit calmly in your seat, twenty – no, thirty feet away from the Professor – wimpy and nerdy and “just doing your job.”

FLETCHER

You speak nonsense, Sir. You can't prove any of that. And I don't have to stand here and listen to another word

(Strides to door to leave; something drops from his coat pocket and clatters to the ground. It's a remote control.)

INSPECTOR

Not so fast! Beatie!

(BEATRICE blocks FLETCHER's exit. Holds his hands together behind his back.)

INSPECTOR

(Picks up remote control. Reading:)

“Remote control for the solenoid voltage supply in the e&m lecture hall.” Care to explain what this is doing in your pocket, Mister Fletcher?

FLETCHER

Doctor Fletcher.

BEATRICE

Wow, what a perfect plan! He didn't even need the lights to go out; that was just an added bonus. He caused the Professor's, er, “heart attack”, from thirty feet away! It would have looked natural even in broad daylight!

(Cuffs him.)

INSPECTOR

All he had to do was switch room numbers. A virtually undetectable change in a physics building. He knew that if any physics professor were confused about a room number, it would simply be attributed to endearing absent-mindedness. He knew that any confusion on the undergraduate students' part would be attributed to naïve stupidity. He knew that any confusion on the TAs' parts would be attributed to their distraction in trying to successfully carry out a stressful, taxing job at sub-minimum wage, while concurrently attempting to write their theses. It was a flawless plan, Mister Fletcher. Almost.

FLETCHER (*Screaming*)

That's DOCTOR Fletcher, Goddamn it! No one ever gives me the respect I deserve. Just because I got my PhD on part-time, in nine years, from a small progressive university in Vermont that no one's ever heard of. Just because my degree is in physics education and not pure research. Just because my last name is Fletcher. I'm weary of it. Weary to death of it. I worked hard to win this position. I worked for years. To have it snatched out of my hand at the last second. And what better way to demonstrate my brilliance, my rich deserving of the award, than to end the first guest lecture using my own knowledge of the field? It was a flawless, brilliant plan.

WEINSTRAUB

(Just now picking up on gist of conversation)

The room numbers were switched?

INSPECTOR

I'll give you "brilliant." But if it'd been flawless, you wouldn't be headed where you're headed.

WEINSTRAUB

So I'm not crazy?

INSPECTOR *(To WEINSTRAUB)*

Well, I wouldn't quite go *that* far.

WEINSTRAUB

Fantastic! So the chalk should be across the hall. I'll go check. *(Exit.)*

BEATRICE

I'll take him outside, Eddie. Yeager and Kaye can hold him 'til backup gets here.

INSPECTOR

Thanks Beatie.

(Exit BEATRICE and FLETCHER.)

AMANDA

So. It was the Dean of Student Affairs.

MARTIN

Kinda obvious when you think about it, isn't it?

KAGYNSKY

I was just thinking the same thing.

JESSICA

Well, I knew it couldn't be Weinstraub – he was just too endearing.

INSPECTOR

Oh, that don't mean nothin', kid.

(Pause. No one's sure what to do now.)

MARTIN

What do we do now?

CHARITY

Can we have class?

INSPECTOR

Yeah, let's have class. I still need these credits. We can't let little trip-ups like this stop us from paving our futures.

AMANDA

But who'll to teach?

INSPECTOR

I'll do it.

MARTIN

You know, lecture's only supposed to last 70 minutes. We're way over now, especially since we started late. Can we cancel for today?

INSPECTOR

All right, all right. Class is dismissed. But be sure to read through the end of Chapter 1 on vector notation. We'll start with dot and cross products on Tuesday. If you need to brush up on your trig, take a look at Appendix C, or get an intro book out from the math library. You're gonna need it for problem set 1.

INSPECTOR is interrupted by various groans and complaints from the TAs and STUDENTS. Disorganized motion erupts as they scramble to pack up and leave – a typical undergraduate lecture hall at the end of class.)

END OF PLAY