

THROCKY GETS PHYSICAL

SCENE 1:

(Throcky Opening begins playing. Throcky wanders across the stage green guitar on his back. He looks around curiously, Tapper enters through center)

Tapper: Welcome, ladies and gentlemen, welcome to our humble production! Today we will present to you a tale of suffering and triumph, song and science. Allow me to introduce... our protagonist!(spot on Throcky) Meet Throckmorton. This is his story. Along the way you'll meet his first love, Roxanne, (Roxy walks into spot) and his second love... physics! (They hold up a physics book.) Any likeness or resemblance to real personages is purposefully coincidental, and the views expressed in this dramatization are not the express views of Mr. Tapper or the Morris School District. I am, in fact, the aforementioned Tapper, and this is my AP Physics class.

(Throcky, Roxy and Tapper walk back into the classroom as the curtain opens... everyone is talking as the music ends)

Tapper: 3...2...and 1. Alright class, today I need about 5 minutes of your time to teach you a new concept. (Roll call: The Man, Darius, Prawn, Felix, Xena, Norton, Sara, Tyson, Pat, Roxanne, Throckmorton)

Darius: (stands up)Uh Mr. Tapper...like I got into U Penn, so basically I'm brilliant

Tapper: (In a sarcastic tone) Well thank you Darius, that's wonderful... [finishes roll call]

Tapper: Anyway class, today we are going to learn about THE BIG FOUR! (Jumps around flailing his arms only as Tapper does and points to the equations on the board) The big four equations apply to objects in motion with constant acceleration. They are (says big four and can't think of the last part of the last equation so he does that thing where he twirls his arms around his head until he remembers it) Throcky!

Are you paying any attention to this!

Throcky : (looking at his calculator game doesn't hear him)

Tapper : THROCKY!! (while jumping up and down like he always does)

Throcky: (jerks to attention, in a fluster) Oh yeah, um, I'm listening!

Darius: Man, you are one pathetic loser, no offense. (just like dumb and dumber)

Roxanne: (sitting next to him) Throcky! We have our final coming up in just one week, and you don't know ANYTHING! ... Come on, snap out of it! (Throcky slinks down in his chair)

Tapper: Alright settle down class. (Gutkowski strides into the classroom, writes "Tapper Sux" on the board behind him, and walks out. Tapper changes to "Suxceeds") So these are the big four equations, you need to know them, take my word for it. You must memorize them. D is displacement, A is acceleration, and T is time. You'll notice that one of these equations is time independent. [wraps up big 4, mentions that time doesn't exist] Alright, any questions?

Felix: Mr. Tapper, like, how can I do that on my calculator?

Tapper: (awkward silence) So, now that you know the basics, go ahead and get into your groups. Your problems are on the board here...(12: #1-90, 136, 172) Oh, and Problem #172? As my father-in-law says, "That's a nice one, Bill!... That's a nice one!" (snaps out of daze) Problems! Go!

Prawn: Yo, I actually want to do my work so that I can get a good grade in this class.

The Man: Shut up Prawn, you're named after a shrimp!

Prawn: Yeah, but I'm named after a BIG shrimp!

The Man: Mmmm.... food...

Xena: Oh my god, oh my god, I failed and this time I'm serious, I failed that last test and I'm going to fail the next one and they're going to kick me out of college and oh my god, oh my god....

Pat: Xena, you need to calm down. Look at it this way, we people who have gotten accepted to UPenn have a little saying that helps in times like this.

Xena: What? WHAT?

Pat: "We got into UPenn, therefore we're always right."

Xena: Oh my god, oh my god, I failed and this time I'm serious, I failed that last test and I'm going to fail the next one and they're going to kick me out of college and oh my god, oh my god....

(Norton says nothing, just makes his slash movement with his hand at Xena)

The Man: Well, I got all of last night's problems, so I don't really see what the point of this group is.

Pat: What did you get for number one?

The Man: 10.7 meters per second.

Norton: Or try 21.

Prawn: It's 15! It's just self-evident.

Xena: Oh my god, oh my god, oh my god!

Felix: Yo, guess what? I know the answer, because I did the entire assignment on my TI-89!

All in unison: Shut up Felix!

(They all start arguing over the answer)

Throcky: Hey guys... (no one listens) ...guys?... how do you set up the first problem? (no one answers, they're still arguing). Well, I tried. (Starts playing calculator games again)

Tapper: Hey, hey, settle down now. (Argument cools down. Tapper leaves stage and comes back dragging

“massless string”) Alright guys, next class we’ll be using this string to demonstrate pendulums. We will consider this string massless, like all other objects in the perfect world.

P.A. : Attention please! (classroom falls quiet) Will anyone attending the University of Pennsylvania next year please report to the office now.

(everyone but Throcky jumps out of his seat and starts running offstage. Throcky, confused, begins to get up)

Tapper: Wait! (holds up his hand to stop them from leaving.) Remember... have fun, be safe! ...And don’t forget your desks! (Everyone runs back and carries off their desks. Throcky, feeling awkward, picks up his desk and follows the crowd.)

SCENE 2:

(Night falls, crickets begin chirping, moon comes out, etc. Throcky and Roxy enter from opposite sides of the stage, Throcky stretches out his arms to hug her.)

Throcky: Hey Roxy, how was your day? (Roxy turns away from him, toward audience, and folds her arms. Throcky, hurt, drops his arms to his sides.) Look, Roxy, I’m really sorry for what happened today in physics class. I know you want me to pay more attention in school, and I’m going to do better, I promise.

Roxy: No, Throcky, you’re not going to. You’ve said it a dozen times before, and I’m still waiting for you to change. If you keep up this crap in college, you’re going to flunk out, and then what are you going to be? A bum??

Throcky: A rock star, a movie star, or an Indy 500 driver, whichever comes easiest.

Roxy: Don’t be so blasé about it! I’m not laughing anymore. I don’t know why I ever started going out with you in the first place.

Throcky: Because I have a very fast car and a very green guitar.

Roxy: Throcky, I want more than that in a boyfriend. All you want to do is go to punk concerts and make out. Don’t you ever wonder what you’re missing in class? Aren’t you curious at all about how the world works?

Throcky: Why do I have to be? As long as the earth keeps going around the sun and I don’t fall off of it, it’s okay by me.

Roxy: That’s not the point. The point is that you don’t get anything out of school... like our physics class. You keep on playing those stupid calculator games, while all the secrets of the universe go in one ear and out the other. There’s this whole part of my life that I can’t talk about with you, that you can’t even relate to.

Throcky: Physics is part of your life?

Roxy: Yes, physics is part of my life! I’ve noticed that some other people in our physics class feel the same way. Obviously you’re not one of them.

Throcky: What do you mean? Some OTHER people?

Roxy: Like Darius. He knows what he’s all about. I mean besides himself. He appreciates physics with his whole mind, his whole soul. He and I have talked about it.

Throcky: I appreciate physics... with my whole body. (Grins)

Roxy: Ew, get away from me. Throcky, I think it’s time that you come to terms with this... rift that is US. WE are a rift. Two more separate people couldn’t exist and be together!! You’re so immature, you can’t understand that I’m interested in deeper things than our relationship offers me... you can’t appreciate that physics may just be more important to me than wasting another night with you doing nothing! If you can’t appreciate my love for physics, then I guess I can’t appreciate you!

Throcky: Hey, wait a minute! I thought we had a lot in common. Like squirrels. Didn’t we both think that squirrels were really cute?

Roxy: Throcky, you’re just pathetic. We’re over. I don’t think this could ever work out in a million years.

Throcky: (getting on knees) I really like you, Roxy! ...I think you’re pretty?

(Roxy gives up and walks away)

Throcky : (stands up, gets angry and yells after her) Look, you ingrate, I put you on my phoenix2 high scores list!! If that isn’t love, I don’t know what is... Think of the squirrels! The squirrels!

(solo)

SCENE 3:

Narrator: For the first time in his life, Throcky regretted slacking off in school. He couldn’t stop thinking about Roxanne and the things she had said to him. While wondering how he could ever possibly regain Roxy’s respect, he got lost on his way home. (Throcky begins fake-walking towards stage right. “Good Side of Town” passes him, followed a bit later by “Bad Side of Town.” Pause.)

Throcky: (looking up at sign) Uh oh, it seems I’ve wandered onto the “bad side of town” (continues fake walking, “Bad Side of Town” passes him) How on earth did I get here anyway? (looks around at his settings kind of lost looking. He sees some graffiti on a wall in front of him.) Hey, that stuff kinda looks like those things we were going over in Physics a few weeks ago. What were they called... Vectors?

(Whistle from West Side Story)

Throcky: (Surprised by sound and looking around in fright) What was that? (Vector gang walks out onto stage, snapping fingers, West Side Story music "Jets"?)

Gangster #1: Yo man, what are you doing in this part of town.

Gangster #2: Yeah man, you picked the wrong place to get lost.

Throcky: I'm really sorry, I had no idea...

Gangster #1: You're trying to tell me you didn't know this was Vector territory?

Gangster #2: Yeah man, what? You think we're stupid or something? Everyone knows this is where the Vectors hang.

Throcky: Really guys, this is a terrible misunderstanding (tries backing away). I don't even know what a vector is...

Gangster #1: You don't KNOW what a vector is? Man, you ain't nothin' but a scalar quantity!

Gangster #2: Man, a vector has both magnitude AND direction.

#1: And remember, when you add them together, you must put them head to tail and find the resultant!

#2: Yeah, and remember, they're in two and three dimensions. (secret vector handshake) $x y z!$

#1: Alright man, if you want to pass through our territory, you're going have to add these two vectors together and prove your worthiness!

[Vector Graffiti Explanation and Problem]

(he puts the vectors head to head)

#1: No! you fool! You don't put them head to head, here's how you do it! (does it)

#2: Do you get it?

Throcky: Like, no, man.

Gangster #1: Maybe this dance will get it into your thick skull.

(Vector dance)

Mike: (hits Throcky with foam bat) You have just gotten vectored! (a la Arnold Schwarzenegger)

(Lightning should flash, signals beginning of dream)

SCENE 4:

(As weird lights and dreamy music continue, Roxy runs on stage in the infamous pink dress, throws leis over their heads as she talks)

Roxy: Throcky, c'mon!

Throcky: Huh?

Roxy: It's time!

Throcky: Wait, wait, what is it time for?

Roxy: We're going to the prom to get married, remember?

Throcky: Really? Wow!

Roxy: Hurry up! The airplane is waiting!

Throcky: Wha? Why do we need an airplane?

Roxy: Because the prom is in Hawaii! Don't you remember? You booked the tickets yourself! That's why we have these leis. Let's go! But first, give me a kiss... (just as she turns to embrace him, the lights go out, strobe, thunder, weird sound effects, she twirls offstage as Throcky stumbles about disoriented. All of the cast runs back and forth across the stage frantically, as the Jeopardy sets are moved out onto the stage. A cast member pushes Throcky into position behind a buzzer desk and everybody dashes off as the lights come up for the Celebrity Jeopardy scene.)

SCENE 5:

Trebek: Welcome back to Celebrity Jeopardy, I am your host Alex Trebek, and these are our contestants. Why don't you tell us something about yourselves?

Roxy: My name is Roxy, I'm in Mr. Tapper's second block class, and I am one of the smartest students ever.

Britney Spears: (Twirling her hair around her fingers looking very interested in her hair)

AT: Ms. Spears, how about you tell us a little about yourself

Britney: (stops with her hair only long enough to say) I don't have to tell you anything I don't want to. (goes back to twirling her hair)

AT: Excellent. and our final contestant, tell us something about yourself.

Throcky: Well, my name is Throcky, and I'm in Mr. Tapper's second block class, and I am also one of the smartest students ever.

Trebek: Alright, lets get started. Roxy you may choose first, your categories are Torque, Force, Electric Fields, Vectors, Words that end in ass, and Newton.

Roxy: I will take Vectors for 100.

Trebek: What is a vector?

Throcky: (Quickly and obviously buzzing in before everyone else)

Trebek: Throcky, your answer.

Throcky: A vector is one of those arrow thingies in our physics textbook.

Trebek: Well, that was almost close to a real answer, but not quite. (Roxy buzzes in) Let's see if we can get an answer with some intelligence from Roxy.

Roxy: A vector is a visual representation of a magnitude, and direction in space.

Trebek: Correct, you may choose the next category.

Roxy: I'll take torque for 500.

Trebek: What are two equations for torque? (Throcky buzzes in) Yes Throcky.

Throcky: Well torque is that thing that happens when you push on doors, [rambling]

Trebek: (Getting angry with Throcky) Well, nowhere in your incoherent rambling did you even come close to a correct answer. We are all dumber for having listened to you. I award you no points and may God have mercy on your soul. (Roxy buzzes in) Hopefully Roxy can pull us out of this black hole of stupidity. (Throcky takes out TI-89 and begins playing)

Roxy: One equation for torque is $R \times F$, which is the radius times the sine of the angle the force is acting on, times the force itself, this is also known as the cross product. The second equation would be the Inertia of the object times the angular acceleration of that object, also known as $I \alpha$.

Trebek: Correct. Since it is abundantly obvious that Roxy is the only one here with an IQ over that of a brain dead laboratory ape, let's let someone else have a turn. Ms. Spears you may choose. (Britney, still utterly fascinated with her hair, does not say anything) I'm not even going to bother waiting, Throcky you may choose.

Throcky: (playing calculator game) Um... I'll take balloons for 700.

Trebek: That isn't even a category.

Throcky: (puts down calculator) Alright, I'll play your game Trebek. I choose Electric fields for 500.

Trebek: You couldn't answer a 500-dollar question to save your life, and you haven't even learned electric fields yet. You know what? I will choose for you. You will take words that end with ass for 100. This word that begins with m ends in ass. M-ASS (Throcky buzzes in) Throcky.

Throcky: (With a proud look on his face) Massive!

Trebek: I am speechless. (Throcky's smile becomes a frown. Roxy buzzes in) Roxy, your answer.

Roxy: What is mass?

Trebek: Thank you. You may choose the next category.

Roxy: I'll take force for 200.

Trebek: What is one equation for force? (Throcky buzzes in) You're wrong, Throcky, stop trying. Next. (Roxy buzzes in) Roxy

Roxy: One equation for force would be mass times acceleration.

Trebek: Good work, you may choose the next category.

Roxy: I'll take Newton for 300.

Trebek: What is the unit for force that was named after Newton? (Throcky clearly trying to buzz in, but nothing is happening) (Britney buzzes in) Ms. Spears you've finally woken up, your answer.

Britney: I swallowed my gum, do you have another piece?

Trebek: No.

Throcky: Hey, my buzzer isn't working.

Trebek: Yes, I had the guys back stage unplug it.

Throcky: You read from the cards, Trebek! (turns to Britney) This man's a card reader.

Britney: Hey, that's kinda like lip-synching!

Trebek: (Roxy buzzes in) Roxy.

Roxy: Newtons.

Trebek: Correct. Roxy you may choose the... you know what, we're just going to final Jeopardy. Roxy you are in the lead with 1200 dollars, Ms Spears, you're in second with 0, and Throcky you are in a pathetic last place with -900 dollars. The final Jeopardy category is Work. The question, what is the formula for work? Contestants you may start writing any time now. (Making observations from his podium) Roxy is no doubt writing the correct answer. Ms. Spears isn't even looking at her paper, and Throcky is a moron. Well, time is up let's see what you have written. (Walks over to Roxy's podium)

Roxy: (shows the answer on whatever we are using for the TV screen) (Work formula goes here, but I can't figure out the symbols on my computer)

Trebek: Work is equal to the dot product of force and displacement.

Correct, and you wagered 500 dollars, which means you are still in the lead with 1700 dollars. (Moves to Britney's stand) I didn't see Ms. Spears pick up her pen, but maybe she did so without me noticing. Ms. Spears, you wrote nothing, nothing at all, alright then, you wagered nothing. Moving on. (Goes

to Throcky's stand and repeats the question) Let's see what your answer is. (Picture of a middle finger) It appears you have drawn a middle finger, excellent, and you wagered, "Suck it Trebek." That's wonderful, just wonderful. What an amazing display of genius. YOU FAIL!

(everyone creeps on stage towards him, echoing, "You fail!")

Throcky: (stumbling from behind his desk/podium as they begin to encircle him) No, no, it's not true, I'm not a failure, I'm not a moron, no, no, NOOOOOOOO!!!! (Suddenly all of the lights on stage cut out, except for a spotlight on him, at that instant everybody shuts up. As Throcky takes his face out of his hands, breathing heavily, everyone files offstage with the Celebrity Jeopardy set. Throcky collapses to the floor.)

SCENE 6:

Newton: (walks out on stage) Well well well, what do we have here? It looks like we have a physics ignoramus on our hands.

Throcky : Hey, who the heck are you old man?

Newton: Hah! Who the heck am I?? I think the question should be, "who the heck are you, and more importantly, why the heck are you ignorant of all the theories I worked on so hard while I was alive?" It's nice to meet you....ummm....(looks down at script)...Thorki...

Throcky: That's Throcky to you!

Newton: Yes, Thorki, it's nice to meet you. I am Sir Isaac Newton (horns play in background and he bows as if he is a king. Throcky is not interested. Newton gets out of his bow embarrassed) Right. Anyway, I'm here to help you out with your little problem.

Throcky: Look buster, when I need your help, I'll ask for it!

Newton: Well, how were you planning to win back Roxy?

Throcky: With my exotic green guitar.

Newton: Are you dense or something? You're obviously going to have to learn the physics that you've slept through this year if you want her to have ANY respect for you. You lost her because of your stupendous ignorance of physics, and if you EVER want to be with her again, you're going to have learn to talk the physics talk, and walk the physics walk! She thinks you're a hopeless loser with the intellect of a carrot, and you had better prove her wrong... otherwise you two are through! Finished! Kaput!

PHYSICS (spot on Physics sign) is the only key to Roxy's heart.

Throcky: (defeated) You're right. I don't know why I couldn't see it before. I never guessed just how much those calculator games in Physics class would cost me. I'll delete Phoenix 2 right away! But how can I ever learn a year of Physics on my own? I'll never be able to understand it!

Newton: Ah, but that's where I come in. Look, I practically invented physics! If anybody's qualified to save you from your ignorance, I am.. We'll have you adding those vectors in nothing flat. It won't be easy. Physics never is. But if you're willing to work at it, and make the sacrifices, I know you can do it.

Throcky: I'm ready, Mr. Newton! I'll do whatever it takes. But make it snappy! I've got deadlines, the prom is tomorrow night!

Newton: Patience, young Skywalker. Physics doesn't come quickly. First you must understand that whenever an object is not in motion, or has a constant velocity, then the sum of all the forces on that object are zero. For example when you sit in class all day not moving, you are in equilibrium. The force of gravity in addition to the force of the chair on your lazy posterior cancel out to an overall force of zero.

Throcky: Yeah, I guess that makes sense old man, but answer me this... How does my chair make a force on me if it doesn't even have any hands to push me with?

Newton: (awkward silence) moving on then ... Next you must understand my second law...the law of motion. (he walks over and pushes Throcky to the floor)

Throcky: (on the floor) Hey! What's the big deal?!

Newton: The big deal is that when an object is moved, such as you were when I tossed you on the floor, the sum of the forces on you is equal to your mass times your acceleration.

Throcky: What's that supposed to mean? Your stupid laws aren't gonna come in handy when you have to deal with these big boys. (he holds up his scrawny fists and Newton is not afraid) Come up with a theory for this, smartypants! (Throcky runs at him and misses him with a punch and falls to the ground.)

Newton: This brings me to my last point. (pulls out a ball and throws it at Throcky lying on the floor)

Throcky: Ow!...what the heck! That really hurt.

Newton: Ahh yes, it hurt because the ball inflicted a force on your head when it hit you. But believe it or not, your stupid head applied an equal but opposite force on the ball. That is why it bounced so hard off of your head. That's my third law: every action has an equal and opposite reaction.

Throcky: Huh??? Wait, but if that's true, how does anything move? Wouldn't the two forces just cancel out if they're opposite?

Newton: No, no, young Throcky. The two forces act on different bodies. If you want to find the net force on the ball, you only include the force produced by your head upon the ball in your calculations, not the force by the ball upon your head, otherwise the ball would indeed have a net force of zero and it would not

move. Get it? (Throcky has a blank stare) Oh, never mind. Just try to remember what we've discussed. I'll let you go back to your disgusting dreams of Roxanne in a second. And don't forget, these laws only work in an inertial frame of reference.

Throcky: Inertial frame of reference? (echoes from people in the wings repeating it)

Tapper: An inertial frame of reference you moron! (Throcky lies back down where he passed out before as narrator comes on)

Narrator: While Throcky may not have understood everything that Newton had to say, he was beginning to catch onto the idea, and when he woke up he was actually slightly motivated about Physics for the first time in his life.

Throcky: (gets up) Well slap me around and call me Susan, I think I might be able to understand all this if I work on it. Oh man! Look at the time, it's 10:00! I gotta get home! (As he starts running, he sees a rock and kicks it) Ow, ow, nuts! Oh, wow, the rock exerted an equal and opposite force on my foot! (music plays showing that Throcky understood something) Wahoo! (Throcky runs off the stage very excited.)

SCENE 7:

(Lights dim, Felix, Darius, and Roxy come on for Tennis Court, lights come up. Darius is flaunting his short shorts and pretending to play tennis with Felix, with Darius on the left, Felix on the right. Roxy sitting on a bench on the left side of the stage admiring Darius. As tennis match comes to an end Throcky and Xena walk on right side of stage.)

Xena: Hey Throcky how have you been?

Throcky: Horrible... I got roughed up by the Vector Gang, they knocked me out!

Xena: A bunch of savages in this town.

Throcky: But, I think I know how to win back Roxy!

(Tennis match has ended with Darius retreating to Roxy,)

Felix (sneaks up behind Xena! *From behind her*): Give me a hug.

Xena: AAAAAAAHHHHHHHHH! (runs left off stage with Felix close behind)

(Darius, and Roxy on bench talking to each other. Throcky stands across staring at the two in utter amazement)

Roxy: Darius you're the man of my dreams!

Darius: Yeah, last night's studying was a wild time.

Roxy: I could watch you study for the rest of my life.

Throcky: Hey! (Roxy and Darius acknowledge Throcky's presence) You know, I've been studying too! And I've learned stuff! Lots of stuff!

Darius: Yeah, sure Throcky, I bet you're a real Einstein now. Oh no, wait, you're the same old dumbass. C'mon Roxy, lets go study some physics. (Stands up with Roxy and they begin walking across stage.)

(Xena runs on stage from side Roxy & Darius are walking towards, and stops when she gets to Throcky trying to catch her breath. Felix follows until he reaches Darius and Roxy.)

Felix: Hey, hey guys, I have a physics lab that my brother did two years ago. Do you want it? Check out the graphics, the data tables, it's wayyyy better than anything you could do by yourself.

Roxy: No thanks, Felix, we have to go study. Anyway, isn't your lab grade a D? (walks away from Felix with Darius)

Felix: (yelling to the backs of Roxy, and Darius) Yeah, but I haven't done a jot of work this year.

Xena: (Finally caught her breath) Oh my gawwwddd, I wish Felix would stop trying to touch me. I can't believe he tried to do it again! Why doesn't he get it? What's wrong with him?

Throcky: Nobody knows. I understand that he was that way even before he joined Block 2 physics. Hey, speaking of physics, you wouldn't believe how much physics is pertaining to my life these days. Whoa!

Light Bulb! (points to top of his head) I can use physics to shoot Felix with this Tennis Ball launcher!

True, he is not my arch-enemy Darius, but he will have to do for the present. The class will be eternally grateful. So, if I want to hit Felix with this tennis ball machine, I need to figure out how far I should put the machine from Felix so that it will hit him. I don't want it to go over him or hit the ground before it hits him. So, what do I know? I know the starting velocity, about how tall Felix is, and gravitational acceleration. What should I do?

Tapper's voice (*comes over in the background*): Remember big four. Memorize big four. Live it...love it.

Throcky: Right! All I must do is split the motion into x and y components and solve for time and use time to solve for x displacement. (*he goes up to the pad and picks up the pen or chalk and he writes as he speaks.*) Well, the component velocity for y is just $v \sin \theta$. Now I need to plug that velocity into big four.

I'll use $y = y_0 + v_{0y}t + 1/2at^2$. Here...let me just put that in my calculator and let it solve for t. (*takes out a calculator and begins to type.*)

Felix: (*yells over to Throcky.*) Hey Throcky, what are you doing over there? (*Throcky notices Felix, but ignores him*)

Throcky: Now I don't want to shoot my tennis ball launcher off more than once because that may cause my "target" to suspect my treachery. How far away do I need to put the launcher? Velocity is distance over time so if I use the x component of velocity, which is $v \cos \theta$, then I can use time and that to find the x displacement. (*Writes $v=d/t$ and then $d=vt$*) (*with a giggling and evil laugh of triumph Throcky says*) We

can't have the prey getting away from the hunter, can we. (*He seems to calibrate the machine and then fires it. It hits Felix and he falls flat on his face*)

Xena, and Throcky: (in unison) SCORE!!

Throcky: (turns to Xena) Well, I'd stay but I have to go home to and study, so I can win back Roxy. (they both walk off, lights dim. Desk comes on, Throcky sits down, lights came back up.)

Throcky: Alright, now that I'm home, I'd better get to work. Now, where were we in class? These equations all look alike to me... how blurry they are... they're so tiring... perhaps it wouldn't hurt to lay down my head... just for a moment... ZZZZZZZZZ...

(Curtains close, scene change from Throcky's room to Hawking dream. Desk remains, all else goes off, ramp comes on)

SCENE 8:

Mike & Someone: Let's go to the Scooby-Doo ending... I mean the Stephen Hawking dream. (Wayne's World finger thingie, Scooby-Doo ending, shows that it's a dream, they exit. Ramp is preset behind red curtain.)

(curtain opens)

(Stephen Hawking is wheeled on... starts poking Throcky with a stick)

Throcky: (Groggy) Hey, who are you, and why are you poking me with a stick?

Hawking: (All speech is computerized and pre-recorded) Who am I punk? I wrote A Brief History of Time, I figured out black holes, I have, like, the biggest IQ in the world, in short... I am the physics god, Stephen Hawking! (thunder?)

Throcky: Why are you here?

Hawking: I am here to help ya get all the womens, dipwad. I hear your punk butt don't know momentum, and energy.

Throcky: Women?

Hawking: Yeah, I gots a great pick-up line for you; The product of the particle's mass and velocity is momentum.

Throcky: (Confused and stupified) Huh?

Hawking: Mass and velocity act independently, but momentum depends on both.

Throcky: I think you went a little too fast Mr. Hackings (mispronunciation)

Hawking: Well, its Hawking, you no business born insecure rat soup-eating honky monkey. My dead mother could add vectors faster than you, so you best be listening up to whats I've gots ta say.

Throcky: (attempting to act cool) Yo Yo.

Hawking: (ignores Throcky and continues) During elastic collisions, two bodies collide, but do not stick together. Kinetic energy is conserved throughout. During in-elastic collisions, two colliding bodies stick together and may move together after the collision. In these collisions, kinetic energy is lost. (As Hawking is talking, someone wheels easel/chalkboard out).

Throcky: Slow down dude...

Hawking: (getting increasingly frustrated, pokes more insisently with stick) With an inelastic collision, the momentum of each body before they collide equals the momentum of the two bodies stuck together after the collision. Follow me. (Stephen Hawking and Throcky start to move across the stage) Hey, look, two sumo wrestlers.

(Sumo wrestlers stomp onto stage, bow to each other, start running from opposite sides of the stage, and collide. They stick together, and fall down.)

Hawking: Since both the sumo wrestlers had the same mass, and their velocities were equal in magnitude but opposite in direction, the vector sum equals zero. If, perhaps, one of the sumo wrestlers were much more massive than the other, then that sumo wrestler would have had more momentum, since momentum equals mass times velocity, and would have shot the other sumo wrestler out of the ring.

Throcky: Oh wow! I see those guys every day I walk home from school, and I never understood before how their wrestling works. This is how I get rid of them. Watch closely. "Cheesecake!" (Points in one direction)

(Sumo wrestlers both turn, stare in the direction of his finger. They shout together "cheesecake"... They both try to run together at the same time, and then one shoves the other out of the way and runs out first, with the second sumo wrestler close behind).

Throcky: It always works.

Hawking: Think you're good, dipwad? That's not going to impress the girlies. Now listen up: you know nothing!! What's kinetic energy, foo?

Throcky: Um, isn't kinetic energy when stuff's moving in circles? No wait, wait, I know, it's got something to do with electricity.

Hawking: Not really, but maybe next time. This is mechanics, you haven't even learned electricity yet, dipwad. Kinetic energy is the energy of motion. Kinetic energy is $\frac{1}{2}$ mass times velocity squared. Do you remember that there's also something called potential energy?

Throcky: Um, yeah, potential energy... isn't that the energy of something not moving?

Hawking: Why don't you just shut your big yapper? Potential energy is basically energy associated with the position of a object rather than its motion. For example, if I were to wheel myself up this ramp, I

would have gravitational potential energy, which would transform into kinetic energy if I rolled back down it. There are also other types of potential energy other than gravitational, such as spring potential energy. (Nurse takes out pogo stick, jumps around) When the spring is compressed, there is potential energy, because the spring would like to return to equilibrium. When the spring is decompressing, there is kinetic energy. In a system, the amount of energy never changes; the energy only varies among levels of kinetic and potential energy. So when kinetic energy is at a maximum, potential energy is at a minimum, and vice-versa. So do you get it? (nurse stops and looks at Throcky expectantly)

Throcky: Sure, sure, no problem. I'm not stupid you know.

Hawking (in a real voice): Cough cough Yeah right (*He runs off stage pushing his wheelchair, giggling furiously, nurse follows on pogo stick*)

(Throcky stares after them, scratching his head. Lights dim, Throcky walks back to his desk, lies down again, wakes up)

Throcky: Oh, dude, look at the time! I gotta go to school! (Starts walking in place, somebody carries off the desk, someone else carries on fire hydrant, and ramp appears)

SCENE 9:

(*a Skateboarder with a bunny hat on skates on stage*)

Skateboarder: I'm late! I'm late! For a very important date! No time to say hello-goodbye, I'm late, I'm late, I'm late. (Skates around frantically, approaches a ramp, and skates up it, and skates back down).

Throcky (says to himself): Why didn't he fly off, like in the X-games?

Skateboarder: (suddenly confronts Throcky) You want to know why I didn't fly off? I'll tell you why! Since all of the surfaces in this area are completely frictionless and gravity was the only force actually doing work on me, total mechanical energy is conserved! During the initial conditions, I was skating on a perfectly flat surface with an initial velocity...I'll call it v_1 . At this point, my total mechanical energy consisted entirely of kinetic energy because he was at a height of 0 meters. At the top of the ramp, when reached maximum height, my velocity was 0 m/s. Therefore, my total mechanical energy consisted entirely of potential energy...I'll label the maximum height h . Because total mechanical energy is conserved in this situation, I can set the initial total mechanical energy, E_1 , equal to the final total mechanical energy at the top of the ramp, E_2 . The maximum height I reached was proportional to the initial velocity, v_1 !

Throcky: I get it! Since the max height is proportional to the initial velocity, the reason that you didn't fly off the ramp is because your initial velocity was too small. If you had an initial velocity greater than $\sqrt{2gh}$, you would have had enough kinetic energy to be converted to potential energy so that you would have reached a max height greater than that of the ramp! In simpler terms, you would have flown off the top of the ramp like I saw Tony Hawk do at the X-Games!

Skateboarder: (staring at Throcky) Are you talking to me? Are you talking to me? I don't see anybody else here so you must be talking to me.

Throcky: (Sensing an abrupt disconnect) Um, I didn't mean to diss you or anything.

Skateboarder (*babbling incoherently*): Hippity hop hophoparoo. (He hops around, bobbing up and down on the skateboard). Let's go for a little nippity nap nap naparoo. (he goes offstage, comes back with a picnic basket, and lays down the basket and a blanket, and starts setting out teacups).

Throcky: Curiouser and curiouser...

Skateboarder: Oh yes, a so very merry unbirthday to me. I think that I'll serve myself some tea. (lies down on blanket) Oh little ant friend, where is the Mad Hatter? (suddenly sits up) Wahoo! Hippitty hophop hoparoo.

Throcky: (Glancing down at wrist) Well look at that, it's definitely time for me to go over THERE now.

(Turns around just as Mike runs across the stage and clocks him with the "vector")

Throcky: What the flux?!?!?

(Throcky collapses to the floor, Skateboarder moves off stage to prepare for the next scene)

Mike: You have just gotten vectored, Part Du!

SCENE 10:

Narrator: Well, it looks like our hero got knocked out... again. Once again Throcky is visited by another physics god. He has already been visited from the past, by Newton, and the present, by Hawking, and now I see the smoke coming from the future... heralding the approach of Future Tapper!

(Smoke machine starts up and Future Mr. Tapper saunters onto stage, matrix style)

FT : You didn't really hit your head. Watch this.

(Tapper takes a spoon out from his pocket and holds it in front of him. He stares at it and then quickly replaces it with a bent spoon that was behind his back)

FT : You see, I can do that because the spoon was never really there.

Throcky : This really isn't helping me learn physics...

FT : (looks at spoon, then quickly chucks both spoons into the wings) OK, never mind the spoon. You must make a decision. The blue pill, and the dream ends, you go back to your regular life of pathetic ignorance. The red pill, and we will see just how deep the rabbit hole of physics goes.
 (Skateboarder skates onstage, stops, hops around) Hippity hop hoparoo! (skates offstage)

Throcky: Does it have to be the same rabbit hole as that guy?

FT : (looks over his shoulder at skater, then turns back, slightly annoyed) Just ignore him. Now, the red pill or the blue pill?

Throcky : I really don't have a choice. I'll take the red pill... for Roxy.

FT : (relaxes) Ah, wise choice my friend... hold on, let me find it in my huge bag of vitamins. (pulls out vitamin bag, snags a red 'vitamin' and hands it to him) Now, let me begin. (Throcky looks at it and pops it)

FT: I imagine you are somewhat confused and disoriented by the physics in the world around you, hm? Perhaps you feel a bit like a dizzily spinning figure skater, always conserving angular momentum?

Throcky: You could say that.

FT: I can see it in your eyes. Let me tell you why you're here. You're here because you know something. What you know you can't explain. But you feel it. You've felt it your entire life. That there's something that makes the world work. You don't know what it is but it's there, just beyond your reach. It is this feeling that has brought you to me. Do you know what I'm talking about?

Throcky: Physics?

FT: Exactly. Physics is everywhere. It is all around us, even now in this very room. However, physics is too BIG for anyone to comprehend all at once, so we demonstrate the concepts in something we call The Perfect World.

Throcky: The Perfect World?

FT : The Perfect World is a simulation, similar to the complex reality of the Real World. It has the same basic rules, rules like gravity, except that all of the equations in the Perfect World are much simpler. Here in the Perfect World, there is no friction, and we can often treat objects as point particles. Understand?

Throcky: Yes!

FT: Then observe, as I jump into this ginormous hole through the planet. (Jumps into the hole, disappears. Wind sounds)

Throcky: (looking down) Wow. That's a really deep hole. (Tapper's feet stick out the other side, Asian Man jabbars at him.) I've never seen a hole go all the way through the Earth... Whoa! (Tapper jumps up again, Throcky pulls back) Wait, how did you get back up here? Didn't you just fall through the planet?

FT : This is a perfect world, so it has a uniform mass density, and as long as I'm in this shaft I am oscillating between the two sides of the globe in simple harmonic motion, whooaaaaa! (feet pop up, Asian Man jabbars.) Save me, you fool!

Throcky : Oh no! I've never solved a problem this hard before! What do I do?

(3 scientists enter, as FT continues oscillating)

#1: Hey, we're Future Tapper's Vector Posse, and now we're in FOUR dimensions! (four-dimensional secret handshake)

Scientist 1 : First you must understand gravity in general.

Scientist 2 : Indubitably. You see, gravity is an inverse function of distance. The farther away from the center of mass of an object you go –

Scientist 3 : The less force due to gravity.

Scientist 1,2 and 3 in unison : However -

Scientist 2 : Things are rather different inside a planet. You see (pull out a chalk board with the proof already done on it) Imagine that you are inside a planet of uniform density so that the distance from you to the center of the planet is r , and the actual radius of the planet is R . To understand the gravitational force acting on you, pretend that you are inside a shell of radius $R - r$. It turns out that the net gravitational force acting on you is 0 no matter where you are inside the shell. Therefore, you can simply ignore the gravitational forces produced by that shell and imagine that you are standing on the surface of a planet with radius r . The formula for gravitational force acting on an object inside a planet of mass M turns out to be GMm/R^3 . If you were on the surface of the planet, r would equal R and the equation would simplify into GMm/R^2 . Pretty simple, huh? As you can see from this formula, the gravitational force decreases as you get closer to the center of the earth, because the "shell" that you can ignore increases in size. This creates the conditions necessary for simple harmonic motion.

Throcky : Simple harmonic motion... Alright, so I can find the period of his oscillation, and then catch him and rescue him from the hole?

Scientist 1 : You're starting to get it...

(Throcky looks at his watch)

Throcky : Here goes nothing... 5, 4, 3, 2, 1!

(Throcky grabs Tapper and pulls him out)

Tapper : You have proven yourself worthy. I think you have the skills necessary to survive in the Real World. So you and Roxy...?

Throcky: Yeah (starts shifting around uncomfortably)

Tapper: Go get her, kid! I have faith in your physical skills ;) (FT thumps him on the back. Throcky runs off, full of energy.)

SCENE 11:

(Throcky gets to the door of the physics classroom and tries to push BUT on the side WITH the hinges. He does this for a few seconds and then stops and steps back.)

Throcky : Alright Throcky. You need to calm down, you know how to do this. It's a simple torque equation, when you increase the lever arm you gain more torque! You have to push on the side away from the hinges! (Pushes in the proper spot and the door flings open)

Throcky : Roxy! I've learned my physics!

(Roxy looks up and can tell instantly that Throcky is telling the truth)

Roxy : Throcky! Let's run away together!

Throcky : Okay! (Roxy runs over to him)

Darius : No Roxy! You're mine!

Throcky : Run! (The two run out the door together, with Darius in hot pursuit)

Darius: Stop this charade! She's a U Penn girl! [More shouting as they run in circles, as the "cars" are brought on stage behind them. They then run back to them and "hop in"] Pull over you fool! You're not Asian enough to be her boyfriend!

Roxy: Drive faster!

Throcky: (everyone freezes, car sounds cut.) Hm, I wonder how I can get Roxy to slide towards me? Wait, if I turn the car to the left, Roxanne will slide away from me. If I turn the car to the right, due to inertia, Roxy continues traveling in the same direction, but because the car and I have changed direction, I will move closer to HER. (All unfreeze, car sounds resume. Throcky swings the wheel, Roxy "slides" over, comes to a stop with a surprised look on her face, then hugs him with a smile.) I love my frictionless seats! (Darius jumps in front of their car somehow, they stop, Throcky jumps out to confront him)

Fight Scene (Throcky vs. Darius)

T: Away villain!

D: To have her love, you must combat me now!

T: I am the dog and you the cat will meow!

D: She's mine! And never shall you have her heart!

T: Please leave this place before you're torn apart!

D: Stop rhyming! She's mine. Don't even try. It's gonna be me, so bye, bye bye!

T: Alright, I guess this means we have to fight.

D: Good thing I brought these swords. May the best man win! (Silence, as Darius adjusts his purple boa.)

T: On guard! (They lift their swords, begin sparring) $v=at!$ (2 step)

D: $U=mgh!$ (4-step)

T: $K=1/2mv$ squared! (Thrust & Parry)

D: Oh yeah? Well, objects at rest tend to stay at rest! (3 step)

T: Unless acted upon by an outside force! (3 step)

D: Torque = I alpha! (leg shot)

T: Momentum equals mass times velocity! (clash)

D: Sum of the forces equals mass times acceleration! (high to low swing 2X)

T: Hah! Only in an inertial frame of reference! (high to low swing 2X)

D: Escape velocity is the square root of $(GMe)/R!$ (2 step)

T: (starts backing Darius across stage) Wrong, sucker! That's the velocity for circular orbit! Escape velocity is the square root of $(2GMe)/R!$ (spinner)

D: No!!!! (Throcky finishes him) I bleed sir, but not yet killed...wait, now I am. Oh, I am slain! (Dies)

R: Oh Throcky! You're so brave and strong! And you know physics! Kiss me now.

T: Let lips do what hands do!

(they kiss)

R: You're so much better than Matt!

T: Who's Matt?

R: Some dork.

T: Well, let's go to the dance!

(lights dim, all three grab chairs as curtains close. Wait 5 seconds, then music starts playing and curtain opens)

SCENE 12:

[Prom scene, "Let's Get Physical" dance]

Block 4 rules!

THE END