

Violet Interview1 - 10.09.2012

Part 1

1 [00:00:42.14] V: Yes. I'm rather one of those outspoken ones when it comes to this
2 class. Because I feel like I came in with a lot of hatred towards physics in general.

3 I: Oh really? Why was that?

4 V: I never took it while I was in high school, so coming in and knowing for the
5 curriculum that I had to take two semesters of physics, something that I never had
6 any exposure to, I wasn't very happy about. And I'm more of a bio and chemistry
7 person, and I just kind of take physics for granted. I was like, oh it falls. OK sure. I
8 think biology comes a lot more naturally to me than physics does. Because I think I
9 can visualize the system better, having taken a lot more biology classes and
10 chemistry classes. And I've just been exposed to more of it. Because, as a bio major I
11 take a lot more bio classes and I had to take 4 semesters of chemistry before I even
12 took this class. So I was more exposed to that side rather than physics itself.

13 [00:02:03.26] I: But you described it with hatred? Why is that?

14 V: Yeah....never been a great relationship with physics, more likely because I don't
15 think I understood it. But now I'm seeing it's not as bad as I thought it was. Until like
16 if I don't know the concept very well, and I don't understand it, like I have a very
17 difficult time liking the subject. But then once I understand and like comprehend
18 what's going on, like my hatred gets toned down. I think that's what I like biology
19 more because I understand it a lot better. And like physics, it just takes like a really
20 long time for it to click. So, I think I'm slowly starting to hate it less. If that makes
21 any sense.

22 [00:02:58.04] I: Are there other....like did you come in hating chemistry and it became
23 less and less? Or is physics special?

24 V: I think physics is special, but like the same thing happened in organic. When I first
25 started taking organic I didn't have a good professor, and what wound up happening
26 is that I went to like 6 organic lectures a week. So I sat in on two different professors
27 every day that I had organic. And then on top of that I would go to discussion and I
28 had lab. But it became a lot easier in orgo 2 because I had a really good professor,
29 who explained things really well, and took the time to like actually like go slow and
30 teach it to a point where it was almost step by step. And I liked orgo by the end
31 because of the good professor.

Part 2

32 [00:11:39.06]V: but i wish there were more examples that we did in class rather than
33 having like a huge class discussion every day um because when it comes to like the
34 homework problems and doing the homeworks I'm always in the corse center on
35 thursdays and fridays working with [the TA] and the other people in our class and
36 like i feel liek this is why i keep telling you to put a camera down there because you
37 would get great footage. So its like everyone just sitting in class its us yelling at
38 eachother becasue we think we're right and then us explaining to other people once

39 we figure out how to solve a problem how they can solve it and its just a more i
40 guess intimate group setting
41 I: mhm
42 V: than when we're in a classroom
43 I: mhm
44 V: and everyone just like works with everyone and just like feeds off eachother's
45 energy and check eachothers work to make sure we're doing it properly because
46 when we're in the course center people can come in with a problem already solved
47 and they just want to make sure its done correctly or like me i go in having read the
48 problem thinking it over but having not solved anything yet. working with the other
49 people there that might be more physics smart than I am and have them um like
50 explain it to me
51 I: mhm
52 V: and then once they leave i'll explain it to someone else because now I know it
53 I: mhm
54 V: so i feel like the group dynamic of this course is great becasue i like hearing what
55 other people have to say and it makes me think about something in a differeent way
56 than i might've normally thought about it. um that's why i was like so gung ho i was
57 like let have group exams! maybe like i'll choose the four smartest people and just
58 work with them um so its good
59 [00:13:57.01] I: so tell me in there you said you like to work with someone whose more
60 physics smart than you
61 V: ya
62 I: what makes someone physics smart?
63 V: i think they can just like grasp the concept more easily than I can you know.
64 someone who can look at it and go like oh ya I know exactly like how to solve this
65 problem and like when kim told that someone almost got a near perfect on this
66 exam i was like [gasp] NO are you kidding me? because as i'm taking the exam and i
67 get to the last question i was like oh my gosh i dont know how to solve this what?
68 what? oh my gosh? and so i, after like going over the problem in class i was like ok i
69 see how you could've done this but in that time contratint hat we had i was like
70 freakin' out where as this person it was like smooth and there were no hurdles the
71 person had to get over because it just came naturally to them.
72 I: mhm
73
74 [00:15:04.03] V: I feel like if that was a biology exam instead, I would have been perfect.
75 Like tody in lab we're talking about like um DNA and stretching the DNA and
76 different aspects of like what would make what would happen to the DNA at certain
77 points. And I was like oh yeah at this point looks like this this this and this. And I
78 went up to the chalk board and like started drawing a string of DNA to like show
79 [the TA] beacuse she was like I dont know any biology. And I was like ok I'll help you
80 with this part, and I mean it just clicked like so much more easier for me.
81 I: mhm
82 V: I was like well DNA is blah blah blah there's this this and this. Maybe this factors into
83 this and like it takes more force for this to happen. So it was easier for me to explain

84 that side and for her and other people in the class the physics just comes so much
85 more naturally
86
87 [00:16:08.09] I: mhm, but you were just, you were saying just now you were saying so
88 maybe when the force does this. So do you think that um your feeling like you're
89 good at doing the biology helps you do the physics part at all?
90 [00:16:07.12] V: I think it did today
91 I: ok
92 V: Like it definitely helped um when we were talking about like
93 I: you were talking about, let me just make sure, I think I have [looking through notes]
94 V: Yeah the recitation that we did today
95 I: From today, right?
96 V: Yeah, exactly.
97
98 ((SKIP BIO??))
99
100 [00:16:39.22]I: This one right? [shows paper]
101 V: Yeah and the questions were like we were looking at this graph and we were trying
102 to say like oh what does the DNA look like at certain regions on this graphs. and then
103 I was explaining to people well like in the cell DNA looks like this at one time, but
104 then at a certain time it can look like this. So if you're trying to stretch the DNA it
105 probably starts out in a more condensed form and then expands. Rather than going
106 from a gobley goop of spaghetti down to like something really tightly compact which
107 normally happens. And so I was drawing out on the piece of paper like oh it looks
108 like it goes from sister chromatids to something thats like less condensed and less
109 condensed and less condensed, and eventually at a certain point you know the
110 hydrogen bonds are going to split and then the back bones gonna split. And so thats
111 where I think my biology came into play like knowing the structure and then more
112 on its like "what properties of the DNA might determine like the force?" [reading
113 from recitation work sheet]
114 I: mhm
115 V: And I was like oh, different bases when they base pair to each other they have
116 different number of hydrogen bonds, so I was like the greater number of hydrogen
117 bonds it has you know the more force you're gonna need to break the bond, the
118 more energy your gonna have to put in to breaking them. And I gave them an
119 example of saying well like you know during DNA replication the helix opens at a
120 point where the DNA is very AT rich beacasue there's less hydrogen bonds to break
121 hence you don't have to use that much force to break them.
122 [00:18:29.08]I: So that's why um you might need less force, or you might need less
123 force because of the actual structure of the DNA
124 V: Yeah
125 I: ok
126 V: And then like we were saying oh like if the backbone breaks where are, where
127 exactly will it break? You know? Will it break where the oxygen is attached to the
128 phosphorous or the oxygen attached to the carbon? Like what's the bond strength
129 gonna be? And um then for the last question where its like [reads from wk sht]

130 "when is it biologically important that the DNA not be under tension?" We were
131 saying oh during DNA condensation when you know genes don't have to be
132 expressed because there are some genes that are not expressed in the cell at all, so
133 that part of the DNA is going to be tightly condensed. And when is it important that
134 it be stretched? Well, during replication, trascription, translation when you actually
135 have to work with that specific gene. And then we're oh there's no tweezers in the
136 cell so what actually you know causes the DNA to do this? Well it's the proteins. So
137 the proteins act as the tweezer
138 I: mhm
139 V: to pull the DNA apart.
140
141 ((SKIP BIO to here)))
142
143 [00:20:01.23] I: So, so uh that beautiful [laughing]...where's the physics that you that
144 you like you did this, this beautiful explanation what physics did you get from doing
145 this? is there anything there?
146 [00:20:17.01] V: I guess like the, like the question about the force
147 I: mhm
148 V: you know how big does the force have to be in order to actually extend the DNA to
149 the point where the proteins can come sit on the DNA and actually read
150 I: mhm
151 V: the different base pairs you know? like how much force actually needs to be exerted
152 I: mhm
153 V: i mean how i mean like when your hearts pumped how much force does your heart
154 actually need to contract with in order to push the blood throughout your whole
155 entire circulatory system? so i guess like thats where the physics can come in
156 biologically
157 [00:21:11.08]I: do you think that knowing the biology is helping you, so it helped you
158 in answering these questions [from worksheet] is it helping in seeing the physics
159 piece of it?
160 V: um sometimes because some of the examples that we do are not biologically related
161 I: mhm
162 V: like the race track
163 I: yeah
164 V: on the car, the pizza box it was like ok, those aren't biological but i can see where the
165 physics fits into them
166 I: mhm
167 V: i think its just like i've taken the physics for granted
168 I: mhm
169 V: because like I've never had to like actually think about it. its like oh i just get in the
170 car
171 I: mhm
172 V: and step on the accelerator and i go
173 I: mhm

174 V: I've never really thought about it like oh the tires are exerting a force on the road
175 and the road is exerting a force back and like the weight of the car has to be equal to
176 the gravitational force. I just never thought of it that way
177 I: mhm
178 V: before so i think its making me think about natural things in a whole different light
179 I: mhm do you think that's useful?
180 [00:22:23.24] V: i think it is i think it is for someone that is like a visual learner you
181 have to know like both the system and what's happening to the system at the same
182 time.
183 I: Nice. interesting.