



“ I arrived to Canada on September 11th and went straight to class the next day. “

UTM Biology Student Shares her Learning Tips

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How I learn

When I'm sitting in lecture, I'm organizing the information into three categories: (1) Concepts, (2) Details, and the (3) "I have no idea what's going on" category. As the professor talks, I listen, understand, write or type, and then categorize. The concepts category is both the easiest and the hardest. It's the easiest when we look at an example and I extract the core from it, only to realize that I already know this concept from somewhere else. If that's the case, then there's only more details to add, and I'll place this example in the details category. For instance: transcription factors can enhance or repress gene expression by interacting with enhancers. That's one concept. Learning specifically about how maternal effect genes enhance gap genes in *Drosophila* embryos is an example or a detail of that concept.

The concept category is the hardest when I acquire a new concept. For example, these same transcription factors can actually act as morphogen gradients before the embryo is cellularized. You can even get competing morphogen gradients for the same enhancer sites. That's a new concept.

The "I have no idea what's going on" category is when I have to go back home and think about what it is that's bothering me about a concept. That's when I start asking questions. It's important for me to make sense of something using my own 'logic' because I'm going to use this same 'logic' during tests. If I don't figure it out, I'm going to get that concept wrong on the test. More importantly, it might even affect the way I understand other concepts!

I also connect information from different courses. My friend says it is like something she learned in her education course called "scaffolded learning." You have the foundation of concepts and you build on it like constructing a building. This is usually how I approach learning new information.

Sometimes it helps to make "mind maps". Once I made a mind map from Bio200 about variability in drug response and the factors that affect it such as: drug-drug interactions, environmental factors, genetic variation and so on. It also helps to make a story out of it sometimes. Sometimes I can put 5 lectures worth of material into one map. This helps me visualize the big picture, not just in my head, but actually on paper (or laptop). That way, when I review it, I'm reminded of how these concepts connect together.

Critical thinking: the beauty of discomfort

Critical thinking plays an important role in a lot of aspects in my life, yet it makes me feel so uncomfortable at times. It takes me out of my safe zone. I worry. What if I dig deeper into what a gene actually means, and let go of all the rules I've learned? What if I confuse myself too much? What if I'm just better off retaining this concept the same easy way, which is just memorizing it or being somehow familiar with it? But when I do let go of that insecurity, and 'investigate', I find that the concept is engraved in my head forever. So in the beginning it's hard, but with practice and learning how to get out of my comfort zone, it gives me the confidence to trust my 'investigations'.

Skills from Courses

Dr. Atallah once told me in Bio207 that there's so much content in the field of biology that it's practically impossible to learn everything; and that biology graduates should be learning the basic foundations and the right skills to build on these foundations when needed. That's why when I enroll in a course, I think about what kind of skills I'm gaining. For example, from BIO207, I learned critical thinking. From BIO202 and BIO310 with Dr. Abdaladah, I learned to pay attention to details. From BIO380 with Dr. Erclik, I learned the fundamental concept of necessary and/or sufficient, which really built on concepts I've learned in BIO207 etc.

Motivation

I can't wait for motivation to start studying or working. If I did, I'd probably be waiting forever. I think motivation for me comes after I start studying. Starting is the hard part, but when I go from one concept to another I'm already hooked, and I'm motivated to learn more.

Life Stress

When dealing with personal stress, I use studying as a distracter sometimes. When everything else goes downhill, I tell myself: "at least I'm in control of my education". That's what helped me get through some tough months when I first moved to Canada.

Painting biology

A friend of mine once told me she describes biology as a painting that's slowly being painted. You start with the outline, paint the background and slowly fill in the gaps, and add the details. I think that this process of painting doesn't ever end, that as I learn more, I might even change the whole canvas.



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