SOME THOUGHTS ON BRAIN-BASED LEARNING

1. DURING SECTION

1.1. Stretching helps thinking. I have a hard time concentrating for an hour straight. Studies suggest you do too, so we will have a formal break for stretching and brain rest 20-25 minutes into class - remind me if I’m not paying attention to time! Physical activity helps your thinking, and downtime helps your brain process information; a break compensates for lost time by making the rest of section more productive.

If you still find focusing difficult, you may want to stretch at other times as well. Everyone cycles which side of the brain is dominant, and if a given task requires a lot from the other hemisphere, concentrating on the task is hard. An exercise that move limbs across the vertical center of your body increases the communication between hemispheres, and should help. An example is touching your left shoulder with your right hand. Rubbing your tummy and patting your head is another good one. Just try not to be too distracting - move out of the way if you need to.

1.2. Drinking water is good. Even 1-2% dehydration impairs thinking, so I encourage you to bring a water bottle (reusable, I hope!) and drink if you are thirsty. (Overhydration also impairs thinking.)

I discourage soda, coffee, etc. because such drinks do not have the same benefits for your brain, and they are a pain to clean up if you spill them.

(Good nutrition also helps learning, but I won’t discuss that here. Eating in section is okay as long as it is not disruptive and not messy.)

1.3. Leaving section and phones distract me. Honestly, I get pretty distracted when students leave in the middle of section, and it takes away from my teaching, so please don’t do it. If you are having trouble focusing, try stretching, working quietly on something else or zoning out for a few minutes; if you are frustrated or overwhelmed, try writing a journal entry about it on a sheet of paper.¹

I also find it very distracting when students play with their phones in class.

1.4. No tolerance for insults or put-downs. Section is a threat-free space where risk-taking for learning is encouraged. You choreographed an interpretive dance to help you understand integration by parts? That is the most awesome thing I’ve ever heard.

2. OUTSIDE SECTION

2.1. Breaks. As in section, it is a good idea to take breaks when you are working, because your brain is not good at learning nonstop. Take a walk, do some stretches, write in a journal, listen to some music, just do nothing, make a mind-map, etc.

¹Sometimes this is not enough, and you really should leave section. I accept that, but it should not be a frequent occurrence.
2.2. **Priming/pre-exposure.** I’ve often heard students lament that a week or two after their exam is when they feel like they have understood the material. That effect is real; it does take time (and downtime, including sleep) for your brain to learn. Many factors influence the amount of time, and you can speed up the process by priming your brain. A week or more in advance, look over material to come. You don’t need to struggle through all the details; just try to get a sense of what’s coming.

If we have time, we can work on priming in section, but...

2.3. **Small groups are great.** I will tell you right now we will not have time to address all your questions in section. I strongly encourage you to work in a **small group outside of class.** Even if you were all stuck on your own, you can make progress together. A group of 2 or 3 is best. In my experience, both as a member and observer of groups, usually only 2 or 3 people participate in a larger group anyway; and the others are not getting the same benefits. Ideally, get as far as you can by yourself (at least the material will be in your head), then work in a group, then think about it on your own again to make sure you understand.

Group work is a great low-stress way of getting feedback.

2.4. **Feedback.** Good learning requires frequent feedback. I encourage you to talk often with other students about course material, your understanding of it, and your feelings about it. I also encourage you to talk to me about your learning process, before or after class, during office hours, or we can make an appointment if needed.

Of course, you also get feedback from homework and exams.

A moderate to high level of challenge (and a low to moderate level of stress) is ideal, but if you find yourself on either end of that (you’re struggling, or you’re bored), come see me.

Just as you learn to ride a bike with feedback (are you balanced or falling off?), you need feedback in learning to write good math. (And you can expect to fall sometimes - that’s okay!)

---

2Okay, this is the kind of thing that would make me roll my eyes as a student and dismiss everything written here as BS. But I have to face the facts - emotion is part of learning. Your brain uses emotions to decide what is important and worth remembering. If you’re excited about learning something, your brain will latch on, but you’ll have trouble engaging a subject you feel very negatively about. And if you feel under threat, the higher-order learning demanded in class is probably not happening at all - your whole brain is co-opted to deal with the threat. So we need to acknowledge and validate emotion as part of the process.