**What were the two most interesting ideas you learned on the field trip, and why were they so interesting to you? Please think deeply, but keep your answers concise.**

Firstly, one thing that was really interesting to me was the thanksgiving approach. One thing that was revolutionary to me was the framework in the mindset of, 'waking up everyday, thankful for a new day.' Learning science in a way, is learning a way of thinking and approach to the world. You learn to 'think' like a scientist. Meanwhile the 'Thanksgiving' framework is an entirely unique way to look at the world. And that's something I found to be fascinating.

Another interesting thing I learned from the field trip was that lichen was a composite organism from the mutualist relationship between fungus and algae. That was something completely novel to me. And I think it really stands as a representation of interactions and codependence within ecosystem - just on a different scale. Like how the fungus and algae create an organism together, so too do the interactions between both biotic and abiotic factors create a dynamic ecosystem.

The most interesting thing I learned on the field trip is neutral theory, which posits that variability in some traits within and between species has arisen from random genetic drift of mutated alleles that are selectively neutral. I find this interesting because it raises fascinating questions about how researchers can “prove” that variability in a given trait confers no fitness advantage to an organism. It seems to me that there could always be some fitness advantage that is immeasurable and/or unimaginable to humans.

I also learned (and sort of observed) that throughout our 1-day field trip on the QUBS land, space seemed to be a more significant driver of variability in soil temperature and moisture than time. For example, when the temperature and moisture of different soil patches in a given area were tested, high variability was sometimes observed, especially between patches that differed in elevation. Conversely, although this was not tested on our field trip, little variability in moisture and temperature likely would have been observed from sampling the same patches at different times during the day due to the vegetation cover that would have mitigated the effects of changing temperatures throughout the day. Assuming this pattern is true and given the importance of optimal soil moisture and temperature for plant growth, which ultimately contributes to biodiversity, then this has interesting implications for whether space should be considered over time for the protection of biodiversity.

The first interesting idea I learned on the trip was about the geology of a site and how that influenced soil type. This was on our first stop, the roadside stop, when we looked at the limestone. This had been discussed in class, but I think the importance of geology affecting soil minerals, pH, water drainage, etc. really set it while we were discussing it in front of a large chunk of limestone. I found this to be one of the more challenging concepts to grasp so I found this very helpful.

The second most interesting idea I learned on the field trip, although this might come off as quite mundane, was the connections between species and an individual’s role within an ecosystem. This feeling of awe came over me at each site with appreciation of the complexity of every individual’s role (from the bacteria and fungus, to pine trees and coyotes) within an ecosystem. I especially enjoyed discussing lichens and fungus in detail and their role, like the Dutch elm disease and beetle interaction.  It was quite beautiful out there and I felt very grateful.

1. The general consistency in soil moisture and temperature across soil types and locations was very interesting to me because, while I understand the effect of snow melt being pretty uniform, I think I expected that soil composition & texture would have a quicker and more substantial effect on water retention in soils, so that even after a few hours soil moisture would be pretty different at higher altitudes, in forests, in fields, etc. But, that difference *was* reflected in our observations at one end of Stoke's Field, where the soil was even visibly much more wet. So that was very interesting.

2. I also appreciated the focus we gave to mosses, and especially to the different types of mosses we expect to see at different levels of succession (eg. comparing our quarry stop mosses to our deer exclosure stop mosses). Mosses are notoriously difficult to identify and I think that looming challenge has kept me from paying too much attention to their differences, but understanding their ecological distinctions is exactly the foundation I needed to start better understanding moss diversity. Species are really easiest and best to understand in their ecological context.

One thing I learned on this trip that struck me was how the intensiveness of the project scaled with size. Reading papers, it's easy to think that there should have been more replicates, or more things should have been examined, but even just seeing your deer-exclusion enclosures and how much work went in to counting and recording trillium blooms really put the scale of projects and how much is reasonably achievable into perspective. Thoroughly examining even the metre-by-metre plots took so much time!

Another thing I learned was just how much activity is always going on around us. Even at the tail-end of winter, there was so much life and so much for us to look at (and get distracted by!). Many studies focus on examining species activity in spring, summer, and fall, and it was so interesting to see so much life and learn so much during a period of time commonly mistaken for a period of "dormancy". It's really interesting to think about what life is doing as it overwinters and seeing it begin to emerge again was inspiring!

One of the most interesting ideas I learned on the field trip was that the Trilliums in the second experimental site we visited were not changing the number of flowering plants per year, but the same plants were not flowering each year. I found this interesting as it sparked a discussion among us as to why it was happening yet the only way in which we could find an answer would be through experimentation. Another one of the most interesting ideas I learned on the fieldtrip was the Thanksgiving Address. I really loved taking the time to thank the natural world for all it supplies us, and it really opened my eyes to what I believe is a better way to view the world.

1. Birchbark does not fully disassociate from the decomposed wood. I thought this was interesting as it contains chemical compounds that aided in its preservation. Birchbark is highly flammable and is used as an excellent biofuel and even holds cultural importance within indigenous communities.
2. Some fungi can have different cell fusions (dikaryotic). The majority of mammals have diploid cells containing one nucleus per cell, a concept I thought was universal. I thought it was fascinating that organisms can have one nucleus from each parent (a total of two) per cell, a phenomenon I would like to explore more.

Our group discussion about soil water content’s impact on temperature really stood out to me during this trip, because during it I realized that I had completely misunderstood the relationship between soil water content (in the context of specific heat capacity) and soil temperature. I really enjoyed and appreciated being able to re-examine this concept in a constructive and helpful way (without feeling judged by the group!), and found the comparison to lake effects especially helpful in solidifying my understanding.

I also found Keaton’s discovery of the large white clump of fungi/mycorrhizae to be really intriguing. At first glance, I admit I would have though the white patches were either a mold or some type of bird feces. To find out what they really were, and their function, was not only extremely interesting and helped me to put into context what we’ve been learning (and what we learned in BIOL200), but it also gave me a greater appreciation for what you can discover in nature (without even looking that hard! How wondrous 😊 ). I intend to apply newfound appreciation for the complexity of the ecosystem around me to future walks and hikes.

One part of our trip that I found both very interesting and important wasat Bracken tract when we walked in silence, paying attention to our senses, and then you read us the Haudenosaunee Thanksgiving Address. I thought this was great because it reminds us of how interconnected humans, nature and the Earth are. Something you said that really stuck with me was that just a simple change in our mindset when we wake up (from “what am I going to do today” to “I’m grateful to have another day”) can have a profound impact on how we go about our day and what we do. This is something that I will be trying to do from now on!

Another interesting idea I learned on the trip was that the water in the soil increases the heat storage capacity of the soil and acts as a buffer to air temperature changes. This can lead to the soil being much warmer than the air or much cooler than the air when temperatures change quickly. I found this very interesting as I have never really thought about why soil temperature may differ from the air.

After careful consideration of what I found most interesting I chose, seeing the differences in soil compositions like water absorption and structure, as well as being able to see these small-scale components of the course so up close, and now be able to understand why its function is so important. In terms of the soil composition and water retention, I found this so interesting because it has never been a thought to cross my mind, however, now when I am outdoors in a certain location I have the ability to infer what the composition is, and why it's so wet, or dry. Finally, in regard to being able to see these biological structures in person, the mycorrhizal fungi really struck out to me most; it was almost difficult per se to fully grasp the concept of this vast network until I saw it in person, which was an eye-opening experience and I hope to be able to see more networks like so.

I enjoyed learning about the apparatuses used to measure soil features. Specifically, I found the apparatus used to measure soil moisture by measuring conductance to be particularly interesting as this is an innovative and efficient method of measuring this characteristic of soil.

I also found the idea of increasing water content in soil reducing its rate of temperature change to be interesting. This was unsurprising given what I already knew about the thermal properties of water, but it is always interesting to learn chemistry and physics interact to create conditions suitable for life on Earth.

This field trip was incredibly eye-opening, and I really enjoyed being out in nature despite the chilly weather! This field trip enhanced my knowledge regarding ecosystems significantly. Something that I personally found incredibly interesting was the time period that it takes for trilliums to flower. As you explained, trillium flower populations are often destroyed due to deer browsing and their slow regeneration time (taking 10+ years to flower). The study conducted at Pangman tract solidified this information, through control and experimental study sites; which both illustrated the slow regeneration time of trilliums (through the counting of flowers every year), and the impact that deer had on these sites. This is important information regarding trilliums, especially with the goal of maintaining numbers of this protected species of flower.

Secondly, something else that really peaked my interest during this trip was how the temperatures and levels of moisture varied within the soil depending on the area. Although in a geographic sense, these areas were close together, it was eye opening to understand how different soil is in different areas, and all of the different species that depend on these different temperatures, and other factors to survive.