Some families pass down recipes; mine passed down lesson plans. My grandmother, mother, and aunts were all public school teachers, and now the baton has been passed to me. Growing up around educators has taught me that great teaching is not a transfer of knowledge - it is the deliberate creation of a supportive environment for students to explore curiosities, ask questions, make mistakes, and grow. I build this atmosphere through intentional choices each day, both in and outside of the classroom. I believe effective teaching requires inclusive preparation, framing lectures as a narrative, and additional structured support.

**Before the First Day (Inclusive Preparation):** I strive to tailor my examples, pacing, and support to the varying experiences and interests of my students. Therefore, I send out a pre-course survey to all of my students, asking them about both their academic and personal backgrounds. I ask them about things ranging from what they find most difficult about math to what extracurricular activities they're involved in. I also give them space to "tell me something else so I can learn more about you." Ultimately, learning about my students allows me to connect the material to their interests while fostering an environment where they feel valued and supported.

**During Class (Math as a Narrative):** College math classes are prototypically viewed as a one-way experience: the instructor at the board, students taking notes. I view the math classroom as an **ongoing narrative**: a conversation between the instructor and the students. At the start of every lecture, I give a concise recap of what we've done before. This helps students re-enter the "story" and highlights any big ideas needed for the lecture. I then move into the key definitions and theorems, and we use them in examples to reinforce those concepts. After every big idea, I always pause for questions. One calculus student said,

> "[Katherine] always explained things very clearly and gave us specific problem solving techniques to tackle problems. [She] also was very good in helping me gain an intuition for some problems."

Additionally, in lectures, I intentionally ask, "What questions do you have?" as this phrasing establishes the expectation that students will have questions, and that asking them does not disrupt the lecture, it enhances it. If I sense hesitation, I gauge their understanding through simpler questions or visual cues, then revisit material with extra examples as needed. This encourages the 'student-side' of our conversation, giving them opportunities to respond with questions and clues that inform my understanding of their comprehension. Another student recognized this in calculus, saying

> "Katherine would always ask if everyone understood what was happening and was happy to reexplain things in a different way if people were having trouble."

**Outside of Class (Structured Support):** Learning happens through a balance of **independent work** and **supervised mentorship**. As such, I supplement lectures with weekly problem sessions, as this allows students to work on problems with an instructor. When teaching single variable calculus, I received mid-course feedback that I was assigning too much independent work. I adjusted and aimed more for instructor-led problem solving, which resulted in students commenting on a "nice balance of individual work and discussion" by the end of the semester. These problem sessions also give students time to reflect on the material from the lecture, and come to the problem sessions with questions about proofs & examples we've seen before. When teaching Analysis, a student commented that reviewing proofs from class helped them "understand them better" and "made it easier to memorize the solving strategy," as they were asked to replicate the proofs in the upcoming midterm.

In addition to problem sessions, I host several weekly office hours. When teaching a single-variable calculus class, one student said

> "She was always available when I needed help and provided such clear explanations that really helped me understand the material."

I additionally write detailed lecture notes to help students review the material outside of class. In these, I often suggest extra practice problems for students to help them reinforce the skills gained in class. One student from my Theoretical Differential Equations class noted that despite missing my problem sessions:

> "The LaTeX notes and materials [Katherine] posted on Canvas were very helpful. In particular, her approaches to some problems provided alternative methods that were not fully covered in lecture, which I found insightful."

To support exam preparation, I facilitate 90-minute review sessions featuring a curated three-hour problem set. I do this deliberately so students have additional problems they can try later outside of the session. The initial 30 minutes of the session are dedicated to self-directed problem-solving. Students are encouraged to work on problems of their choice, ranging from easier questions to build confidence to more challenging exercises aimed at strengthening problem-solving skills. Then, I go through a problem from each exam topic, so students get exposure to every area. I post solutions immediately afterward so students can check their own work. For larger classes, I also facilitate question forums, so students can communicate with course staff outside of scheduled hours. This was recognized in my work as a TA for a calculus class at MIT, as one student said

> "Katherine hosted a lot of helpful review sessions and was extremely active on [student question forum]... I could never understand the content from lecture, but Katherine's teaching saved me. I can confidently say that Katherine taught me the entirety of [calculus class]."

Ultimately, these strategies help students effectively engage with the material and receive additional support and instruction to reduce misconceptions.

**Future Growth (Active Learning and Overall Mastery):** Learning how to teach is never complete, and there's always new strategies I'd like to implement in the classroom. I'd like to build a curriculum based on learning objectives, so students always know what skills they will be practicing. Additionally, I would like to use an exam redemption policy: if a student demonstrates stronger mastery of Exam 1 material on Exam 2, that later performance replaces the earlier exam score. This policy rewards **ultimate mastery over initial performance**, ensuring students are credited for what they eventually learn rather than penalized for how long it may take. Lastly, I'd incorporate more **active learning** in my lectures through short "clicker" questions and exit papers asking students what they found unclear. This creates immediate feedback loops - adjusting my teaching pace and addressing misconceptions before they become ingrained.

While I hope every student learns to love math, I recognize not all will. Therefore, I hope all my students learn to problem-solve and feel supported throughout their learning. By fostering this environment, I aim to honor my family's legacy: by treating teaching as an opportunity for students to take intellectual risks and grow. One of my greatest joys in life is seeing students leave comments like this: **"I feel much more confident in my abilities thanks to her guidance."**