Teaching Philosophy

Cultivating Creativity, Curiosity, and Confidence Through Mathematics

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A strong education equips students to handle unfamiliar situations, not just repeat solutions to practiced exercises. When the context changes or a new constraint appears, students should have the conceptual tools to reason through it. Mathematics is, in my view, the discipline best suited for developing that capacity. It provides a precise, structured setting in which students learn to adapt ideas and build strategies for problems they have never seen before.

Learning as Curiosity, Not Just Compliance

I see teaching and learning as closely connected activities. My own understanding is sharpened by student questions, and I treat curiosity as a constructive academic resource rather than a distraction from rigor. A formative moment in my early mathematical development was encountering Yakov Perelman's *Mathematics Can Be Fun*. It showed me that genuine learning grows out of exploration rather than external pressure. I aim to create conditions where students engage with mathematics in that spirit, asking meaningful questions and discovering why concepts matter.

Pedagogical Practice: Structured Problem Solving

I design my courses as collaborative workshops that are serious, welcoming, and focused on conceptual discovery. My guiding principle is that students should regularly encounter problems that are accessible yet non-routine. I provide a core mathematical toolkit, then ask students to use those tools in ways that require recognition of structure and thoughtful selection of method.

A common example is an exercise that initially appears computationally heavy but becomes straightforward once a geometric or structural idea is identified. Discovering that shift teaches students that efficient problem solving depends on viewpoint, not mechanical effort. This habit of selecting the right perspective generalizes across mathematical topics.

My professional experiences have shaped this approach. During my B.S. and M.S. degrees, I wrote problems for a Pan-India mathematics quiz competition. The work required careful attention to conceptual depth and the "insight step" that makes a problem meaningful. It informs my assessments, which emphasize structure, explanation, and strategy rather than memorized formulas. Mentoring a Directed Reading Program student in cryptography reinforced the same lesson. Framing modular arithmetic as a tool for genuine problem solving allowed the student to understand the subject as an interconnected system rather than a list of facts.

Building Confidence in a Collaborative Environment

A central part of my teaching is making the process of discovery visible. I encourage students to test ideas, articulate partial reasoning, and refine their thinking in real time. I speak openly about the role of initial mistakes in mathematical work and help students treat those early attempts as informative steps in the larger process of understanding.

A student I will call Jon illustrated the importance of this approach. He had strong analytical instincts but often abandoned promising ideas due to self doubt. I reorganized office hours into small group work sessions and offered targeted encouragement such as "You are on the right track, keep going," followed by concrete guidance when needed. Over time he became more confident, and his written work began to reflect the insight he already had. This experience reinforced for me that effective teaching involves content, structure, and also the development of resilience and self assurance.

Methods and Adaptability

My methods adjust to the size and structure of the course. In small and mid-sized classes, I use short concept introductions, think-pair-share activities, and whole-class analysis of anonymized work. These activities give students practice in presenting and evaluating mathematical arguments.

In larger lectures, I would use rapid concept checks and short, low-stakes questions to maintain engagement and identify misconceptions early.

Serving as an instructor in a coordinated multi-section course of about twenty sections taught me the importance of consistency and fairness across instructors. I value clear expectations, shared learning goals, and consistent grading standards. At the same time, I work flexibly with dedicated students who balance significant responsibilities, including health challenges or athletics. For me, rigor is demonstrated through quality of engagement and conceptual understanding rather than identical circumstances for every student.

Preparing Students for Mathematical and Real-World Complexity

This approach prepares students for the kind of open-ended situations they will face within mathematics and beyond. Rote learning is fragile. The ability to analyze a new problem, choose appropriate tools, and adapt one's approach is durable and widely applicable. Mathematics provides an ideal training ground for this kind of reasoning.

I am motivated by examples from across disciplines where structured thought and creative insight work together. These models highlight a central principle. Technical knowledge becomes powerful only when applied thoughtfully and ethically to new contexts.

My goal is for students to leave my courses with more than a list of techniques. I want them to see mathematics as a robust instrument for exploration, to be comfortable with the productive struggle that precedes understanding, and to have the confidence to approach unfamiliar problems with clarity and creativity. My students are not only learning to solve assigned exercises. They are practicing how to think mathematically about situations they have not yet seen, which is, in my view, the central purpose of their education.