Teaching Statement

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My experience as a teaching assistant over the past several years and as an instructor of record this summer has led me to believe that teaching is a collaborative and reflective process in which the instructor and the students share responsibility for meaningful learning. My teaching philosophy is grounded in the belief that students learn most effectively when they are supported in actively constructing knowledge by developing their own mental models of the course material, rather than passively receiving information. This principle matters even more now that AI can produce answers on demand. As an instructor, my role is to provide clear conceptual foundations, guide students in making connections, and help them recognize their own agency and potential as learners by providing scaffolding for their learning.

I put these beliefs to the test. I designed and taught PHYS 1A (Mechanics) across both 2026 summer sessions at UC San Diego, with more than 80 students in total. Most of the students were life-science majors taking the course to meet their major or pre-professional requirements. Being responsible for every part of a course, from the learning outcomes to the design of the course Canvas page, showed me where my philosophy held up and where it needed to grow.

Designing the course for the students

Effective teaching begins with well-defined learning goals that fit both the broader curriculum and the students. Because PHYS 1A is a semi-standardized course with a department-designated textbook, I began preparing three months before the summer by meeting with instructors who had taught it before. I wanted to understand the department's expectations for the learning outcomes before writing my own, so that my course would fit coherently within the program.

Those conversations also taught me about the students I would be teaching: mostly life-science majors with minimal background in physics who needed physics as a foundation for their fields. Alongside the core topics of kinematics, Newton's laws, and energy and momentum conservation, I therefore added fluid mechanics and rotational motion, which connect directly to their disciplines.

To help students absorb this breadth on a compressed schedule, I organized my lectures into modules that follow the same arc: introduce a concept, motivate it with a simple example, pause for an in-class poll and discussion so students can process the new information, show a live demonstration where possible, integrate the new concept with earlier material in a more challenging example, and then close with a summary of problem-solving tips. This predictable structure provided students with a consistent path from exposure to application, with regular moments for them to do the thinking themselves.

Making physics relevant

Students bring diverse backgrounds, strengths, and learning preferences to the classroom. To support this diversity, I strive to offer multiple pathways into the course material. In particular, I make frequent use of

visualizations, which help students organize complex ideas, and analogies, which connect abstract concepts to their lived experience.

The power of relevance became clear to me during the unit on fluid pressure. In one lecture, I asked students to determine how high a bag of IV solution must be hung for an injection to work. I chose this example to show life-science students why the physics of pressure matters to them, but its impact went further than I expected. Several students told me how excited they were to see it, and connecting the concept to their own experience helped them internalize it. This experience led me to recognize relevance as one of the most effective forms of scaffolding I can offer.

Lowering barriers and building trust

Equity is central to my teaching, and it means removing obstacles that have nothing to do with physics. A course with many kinds of assignments asks students to spend real effort on logistics: what is due, when, and how to balance it all. To scaffold the logistics as well as the content, I consolidated the course's Canvas site into a single page and laid out every task in a day-by-day calendar, so students could focus on the learning outcomes rather than on deadlines. Students noticed, and one called it the "most student-friendly Canvas interface I've ever seen."

Resources only help if students feel welcome to use them. I build relationships based on trust, care, and mutual respect, beginning with the language of my syllabus policies. I held office hours in the classroom immediately after lecture and added afternoon office hours for those who could not stay. In addition, I emailed students who struggled on assessments to offer help, and I conducted a mid-course survey in each session to gather feedback and adjust the course to the needs of each group.

Assessing for learning

Through my teaching, I have become aware of a cognitive gap between instructors and students. Students often focus on procedural steps and course-specific tasks, while instructors reason in terms of interconnected concepts. This gap makes it difficult for students to articulate their questions and for instructors to read student understanding accurately. To bridge this gap, I probe student understanding frequently.

In PHYS 1A, I layered several formative assessments: in-class poll questions, short daily review quizzes to reinforce new material, weekly homework, and weekly in-class quizzes for comprehensive understanding. Each quiz was followed by a correction assignment that let students earn back points by working through their mistakes, turning assessment into another opportunity for students to take ownership of their learning. The in-class polls were especially valuable, letting students attempt problems on their own and letting me address misconceptions in real time.

A peer observed one of my lectures during the first summer session, and the feedback I received helped me sharpen the practices outlined above. I added prompts to my slides reminding me to pause, invite questions, and read the room. I also adjusted practice problems to focus on choosing principles and setting up the solution. This change distinguished lecture from homework, as the classroom became the place to integrate concepts with problem solving. Students said they appreciated the interactive lectures and the chance to work examples themselves, although some said they wanted more time to do so.

Balancing rigor and motivation

The most important lesson I learned this summer was about the relationship between rigor and motivation. I have always believed that learning outcomes should not be watered down to make a course easier to pass, and I designed my weekly quizzes to fully reflect the outcomes I laid out at the beginning of the course. Yet the quiz averages hovered around 50%. Through conversations with students who consistently underperformed, I realized that many of them had not failed to achieve the learning goals. They had in fact mastered individual concepts and skills, but were missing a few links needed to succeed on comprehensive problems. This was the cognitive gap in action. The repeated low scores gave them little evidence that they could do well in the course, and their morale suffered.

Their feedback changed how I think about assessment design. My quizzes were short (six multiple-choice questions and one free response), and every question targeted the course's most demanding end goals. Most of the questions asked students to interpret a physical scenario and then solve for a quantity, a task that layers conceptual and analytical skills at once. When I teach again, I will sort my learning outcomes by difficulty and order the quiz questions from easy to hard, so early questions serve as a warm-up and students can feel their progress. I will also diversify the question types in quizzes, testing conceptual and mathematical skills separately as well as together. Rigor remains the goal, but well-designed scaffolding is what lets students meet it with confidence.

Teaching physics alongside AI

Rethinking rigor also means rethinking what mastery looks like now that AI is an inevitable and essential part of both learning and applying physics. Because AI tools can now solve most standard problems in an introductory course, I no longer see independently producing a complete solution to a physics problem as the only measure of mastery. Instead, I aim to develop two abilities in students: laying out the main steps of a solution, and judging whether a solution is correct and locating its errors. Both depend on the mental models I described at the outset, since a student cannot evaluate an answer without understanding the physics behind it.

This view reinforces two practices described above: (1) frequent in-class assessment, since homework can no longer reliably show what students understand, and (2) lectures built around worked examples that emphasize setting up solutions over arithmetic. In future courses, I also plan to add exercises in which students critique flawed solutions, including AI-generated ones.

More broadly, I want collaboration to play a larger role, in response to students' requests for more problem-solving time. I plan to open with icebreaker activities so students connect with one another from the first day, and to restructure lectures to leave significantly more room for student-to-student problem solving through think-pair-share activities or assigned groups, with clearly communicated expectations.

Teaching my own course showed me that rigor and accessibility need not compete when assessments are designed to scaffold students toward ambitious goals. My aim is to help every student take ownership of their learning, develop the conceptual understanding to plan and judge solutions, whether their own or an AI's, and leave with confidence in their ability to engage with complex ideas.