

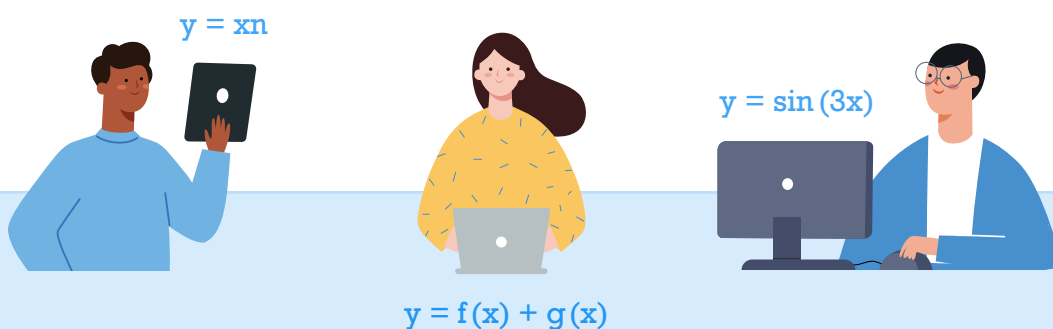


**Kate Kreinheder**  
Lake Shore AP Calculus teacher

## CASE STUDY

# How 87.5% of AP<sup>®</sup> Calculus Students in a New York School District Earned Exam Scores of 4 or Higher

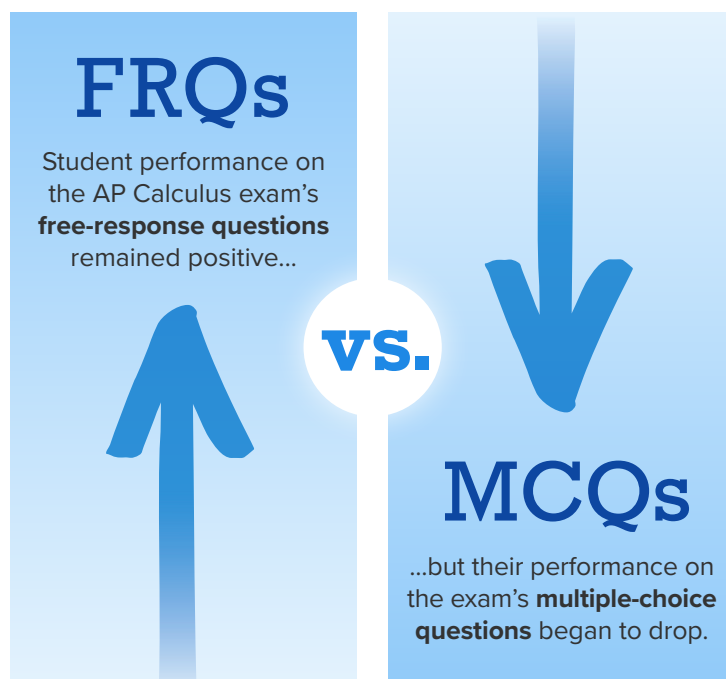
Over the past twenty years, Kate Kreinheder has loved teaching in the AP<sup>®</sup> Calculus program she began at Lake Shore High School in New York's Evans-Brant Central School District. Kate first recognized the need for a more advanced curriculum after transitioning from an honors calculus program. She's enjoyed teaching AP students ever since. Throughout her time as an AP Calculus teacher, other educators have looked to Kate for guidance on effective AP teaching strategies, and her passion for her work and her students has led her to mentor teachers who are new to the AP classroom.



Although the COVID-19 pandemic has created some learning gaps and resulted in some students shying away from college-readiness courses, Kate has continued to encourage students to take on the challenge of AP Calculus and has promised to support them every step of the way. As a result, her most recent class from the 2022-2023 school year was small, yet all of her students were dedicated to putting in the hard work required for AP Calculus. And so, although Kate knew there would be new trials to overcome as a result of the past few years, she was determined to help them reach their AP goals.

## The Need for a Multiple-Choice Question Resource

As an experienced educator, Kate knows AP Calculus course content like the back of her hand. Still, teaching a college-level class has come with its own distinct set of challenges. For one thing, the COVID-19 pandemic took a toll on the strategies Kate had relied on in the past to prepare her students for the rigors of AP Calculus. Like so many teachers worldwide, Kate needed a way to build confidence in her students and help them take ownership of their learning, giving them the ability to feel genuinely prepared for AP coursework requirements and the exam.



Additionally, she noticed that although students had continued to perform well on the AP exam's free-response questions (FRQs), they had begun to struggle with its multiple-choice questions (MCQs). Kate tried several resources, such as the College Board®'s AP Classroom and a variety of textbooks, but found they were not user-friendly and did not provide satisfactory feedback. Kate needed a solution that would offer effective MCQ practice and comprehensive explanations to help her students improve.

## A MCQ Solution With All the Right Answers

It seemed almost serendipitous when Kate first learned about UWorld College Readiness and their [Learning Tools for AP Courses](#) in the spring of 2021. She was just beginning to prepare for her students' final exam review and believed UWorld's extensive question bank with its realistic MCQs and detailed answer explanations could help her students with the multiple-choice practice they so greatly needed. Even with a last-minute integration of UWorld into her summative review, Kate saw improvement that year. She wondered what would happen if, the following school year, she had her students start using UWorld from the very beginning of the course.



**“I really liked the fact that the students got feedback right away...”**

During the first full year of UWorld implementation in her AP Calculus class, Kate saw even more improvement in her students' ability to take on the exam's multiple-choice questions. She found that the students having access to UWorld's instant feedback and answer explanations all year helped them significantly more than just using the learning platform during their final weeks of review.

"I really liked the fact that the students got feedback right away," explained Kate, "so they kept a journal, and in it, they were supposed to write down, 'What didn't I get about this question?' and so on."

Still, Kate continued to use other resources for multiple-choice as well, so she wondered what would happen if she were to dedicate all of her students' MCQ practice time to UWorld the following year. This made a difference in ways Kate had never even imagined possible.

## "All-In" for AP

Kate's 2022–2023 AP Calculus class was small, consisting of just eight students, but in her words, they were "all-in." From the very beginning of the year, her students consistently used UWorld—and only UWorld—for their multiple-choice practice.

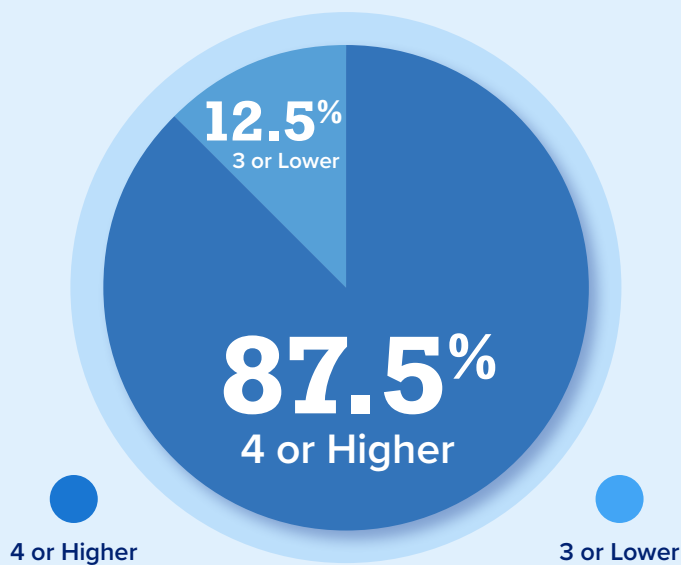
"It just became part of our routine," Kate said of her approach that year, "and they all felt that it was helpful."

Kate implemented a flipped classroom approach, so each week she would assign her students videos to watch with a corresponding UWorld assignment of 6–12 MCQs. After the assignment was due, Kate used UWorld's reporting feature to see which questions the majority of students missed as well as which answers they chose to help her identify misconceptions. She would then review these questions with her students, address any further concept questions they had, and pull students for conferencing or small groups to address their differentiated learning needs. Kate's UWorld routine was an example of data-driven instruction at its finest in a real-world application.



**"They felt that UWorld more than prepared them..."**

## Kate Kreinheder's **AP Calculus Scores** (2023)



UWorld's answer explanations not only helped students understand why a correct answer was correct, but also helped them understand why incorrect answers were wrong. Colorful images, graphs, and charts helped students break down difficult concepts and develop authentic learning connections. By the time Kate was reviewing for the AP Calculus exam at the end of the year, her students hardly had any clarifying questions.

In a survey given after they received their test scores, nearly all of the students said they felt well-equipped for the AP exam.

"They felt that UWorld more than prepared them for the multiple-choice," said Kate, "In fact, on that part of the exam, they actually felt overprepared."

Consistent use of UWorld significantly influenced her students' exam readiness and comfort level. Out of Kate's eight students, six earned a score of 5 on the AP Calculus exam, and one earned a 4. With 87.5% of her class earning high scores, Kate knew that her strategy to use UWorld to improve her students' MCQ performance, in combination with her flipped classroom approach, had paid off and had been a success.

### Paying it Forward Through Mentorship

Kate's experience with UWorld has inspired her to continue using the platform and expand how she uses it in her classroom in the coming school year. She plans to incorporate UWorld's multiple-choice questions into assessments, eliminating the need to create questions herself.

Kate also believes that new AP teachers could benefit from using UWorld as a resource and that while doing so, they should find mentorship and collaborate with experienced educators who can support them.

"I have two more years to go [until retirement]. I love what I do...I keep telling one of my co-workers I should mentor [new teachers]. This is what I should do for AP."

Looking ahead, Kate envisions UWorld expanding its programs that provide the support and collaboration AP teachers need to excel in their classrooms.

Learn more about how UWorld strives to make a difference in the lives of teachers and their students with our [Learning Tools for AP Courses](#).

For more information, please contact your local representative, or visit:

**collegereadiness.uworld.com**