Poland Regional High School: Expanding Options with Data Science and Personal Finance

Poland Regional High School has embraced innovative approaches to mathematics education, and in recent years has worked to expand the mathematics electives that are available to students—specifically by adding a data science course that is accessible to more students.

> **About Poland Regional High School:** Poland Regional High School, part of RSU16, is located in rural Maine near Poland Springs. The school serves approximately 500 students in grades 9-12.

Overall Integrated Approach

The school's approach to mathematics education includes use of standards-based grading across courses as well as an integrated approach to mathematics instruction. Rather than offering separate Algebra, Geometry, and Algebra 2 courses, the school offers courses labeled Math 1, 2, 3, and 4 that all incorporate algebra, geometry, and statistics content. This integrated approach allows for more flexibility in student progression. Many students test out of Math 1 based on middle school performance, allowing them to start in Math 2 as freshmen. Some students take Math 2 and 3 concurrently, while others spread the courses over multiple years based on their individual needs and goals.

"That's been a theme for the past couple of years: How can we provide the best meaningful experience for a wide range of students instead of expecting each kid to take the same path?"

Expansion of Available Elective Math Courses

The school's flexible structure creates more room in students' schedules for advanced coursework and electives, particularly during junior and senior year. The school offers AP Calculus and AP Statistics for students on an accelerated path. They have also developed two new elective options to engage students who may not be interested in or prepared for AP-level math courses. During the 2023-24 school year the school has started offering a Data Science course.

Data Science

One key new elective is Data Science. The impetus for developing this course stemmed from initial conversations about how to offer a statistics option other than AP Statistics to meet more students' needs. Ultimately, in recognition of the growing importance of data literacy and analysis skills across many career fields, the department decided to offer a Data Science course, and one teacher took on the challenge of identifying curricular materials and putting the course together.

This teacher reviewed several available sets of materials to try to find the one that would be the right fit for his school and students. It was clear during this review that traditional textbooks are not available for data science—the field is too new and it is all technology-based. Ultimately, the teacher determined that UCLA's Introduction to Data Science program was the best fit. The program, which he learned about through conversations with the Maine Department of Education and at a math conference, provides both a comprehensive curriculum and teacher training. It uses the R programming language, which is an open-source programming language used frequently in the field of data science, and also employs tools like Jupyter Notebook. It starts with basic coding exercises and builds to more complex data analysis and visualization projects. No prior programming experience is required for students. The teacher also plans to

supplement this program as needed with free online resources such as those from Jo Boaler's YouCubed.

The program also includes online training sessions, which the teacher found essential for preparing to teach the course. The training consisted of a series of nine sessions taught by a UCLA professor where participating teachers worked through the curriculum and prepared the software to be ready to teach this year.

Use of the curriculum will cost the school about $1000 per year. For this first year, the program is free because the teacher received a fellowship from the program to cover training and the curriculum for the year. The math department hopes to continue funding the course in subsequent years—and gathering student feedback may be one avenue the school will consider to demonstrate the course's value.

"Data science is something that's becoming more and more relevant in our technology-based world. Everything that students access, from algorithms to what Google knows about them—it's all big data, and having kids that are a little more educated about how that all works is a desirable outcome for teaching."

Summary

The data science course exemplifies Poland Regional High School's commitment to providing relevant, accessible math options for all students. This elective allow more students to engage with quantitative reasoning in real-world contexts, while also providing additional advanced options for students who complete the core math sequence early. Looking ahead, the school plans to closely monitor enrollment and student outcomes in the new data science course. They will use this information to refine the curriculum and potentially expand elective offerings. The math department remains open to adopting new resources and approaches as the field of mathematics education continues to evolve. They will continue working to ensure all students graduate with strong quantitative reasoning skills applicable to their future educational and career goals. Their innovative approach serves as a model for other schools looking to expand offerings for students, including by adding a course such as Data Science.