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Using Algebra to Explore Population Genetics in Lactose Tolerance

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High school students often need help to see the practical applications of algebra to become engaged and motivated. To bridge this gap, the proposed unit "Using Algebra to Explore Population Genetics in Lactose Tolerance" takes a unique approach. This interdisciplinary unit focuses on the genetic trait of lactose tolerance to demonstrate practical algebra applications in biology. The unit covers fundamental concepts such as mutation, selection, genetic variation, allele frequency, genetic drift, and linear selection models, using mathematical models to illustrate the spread of lactose tolerance in human populations. By integrating these concepts, the unit enhances students' understanding of algebra and biology, preparing them for standardized assessments and fostering critical thinking and problem-solving skills.

The unit employs various teaching strategies structured over several weeks, including inquiry-based learning, building thinking classrooms, three reads, collaborative learning, and real-world applications. Students engage in activities such as calculating allele frequencies and creating graphs to understand genetic frequencies based on selection coefficients, mutation factors, and critical points of genetic drift. Assessments include quizzes and reflection essays. The unit provides a comprehensive list of references, offering a solid foundation for the unit's content and additional resources for further exploration. This approach aims to inspire students by showing the importance of mathematics in scientific research and real-world problem-solving, encouraging them to pursue further studies or careers in STEM fields.

(Developed for Algebra II- B1, B2, and B3, grades 9-12; recommended for Algebra II, grades 9-12)