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The importance of mathematical models to scientific discovery: a case study on the feeding mechanism of the Goliath Grouper “Epinephelus Itajara”.

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Summary: The use of collaborative problem solving within mathematics education is imperative in this day and age of integrative science. The formation of interdisciplinary teams of mathematicians and scientists to investigate crucial problems is on the rise, as greater insight can be gained from an interdisciplinary perspective. Mathematical modelling, in particular, is increasingly recognised as a fundamental tool in understanding scientific phenomena, with models utilising mathematical disciplines ranging from statistics to differential equations. Geometry is an effective tool in biomechanical modelling, and one that has been used to develop a series of lessons regarding the functional importance of mathematics in nature. In this article, the authors present a lesson in which geometry is used to model the suction feeding mechanism of the Goliath Grouper, and the consequences of geometric variability for organismal performance are explored. (ERIC)

Classification: M50 M60 G40

Keywords: modeling; interdisciplinary instruction; geometry