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Justin Dunmyre* (jrdunmyre@frostburg.edu), **Nicholas Fortune**, **Karen Keene** and **Chris Rasmussen**. *An algorithm founded in intuition: Guiding students to reinvent Euler's Method.*

We present an inquiry-oriented sequence of tasks that elicit student intuitions about slope fields; the instructor can leverage those intuitions into class discussion. The students then solidify the geometric interpretation of the technique via a GeoGebra applet that requires them to manually move and lock vectors into place to generate the numerical solution. Finally, the students develop a tabular method of finding the numerical solution, and formalize their method as a reinvention of Euler's method. We leverage student thinking that the initial value of $\frac{dy}{dt}$ gives the change in the y -variable per unit change in the t variable as a foundational stepping stone to the algorithm. This leads to a natural understanding of the use of smaller step sizes. The end result is that, for our students, Euler's method is no longer a dry algorithm, yet, it is a fundamental and intuitive tool for understanding differential equations. (Received September 24, 2017)