When beginning to work on a new problem, most applied mathematicians start by non-dimensionalizing the model that describes their system of interest. The process of non-dimensionalizing consists in replacing dimensional quantities (with units) with non-dimensional quantities based on situation-specific scales. Although this procedure is rarely taught in math classes, it is fundamental to applied mathematics research and it has several surprising advantages. In this talk I will give an introduction to non-dimensionalization procedures. I will discuss how scaling equations appropriately can simplify models and solutions. Finally, I will show how these processes apply to the advection-diffusion equation.