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Yours, Mine, And Ours; A Basic Model Of The Spread Of Air Pollutants

This project's intent is to provide me with an understanding of how pollutants released into the local air supply, affect surrounding areas. My idea was to create a basic computer model to better understand the process of diffusion and how it pertains to pollutants released into our air. My computer model showed that over time, pollutants introduced into the air will, through diffusion, spread throughout the test area. My procedure models the diffusion of air pollutants in a spreadsheet using a random walk. I created a series of functions in a row of the spreadsheet to model a single step of the walk using MScExcel's RANDBETWEEN() and CHOOSE() to develop the XY coordinate pair for each point on the plot. I then copied this line 49999 times for a run. Each run simulated a single pollutant particle. I then created a separate set of 5 runs at 5 different origins to represent 5 pollutant sources. I observed that each time I re-ran the data on a particular run; the walk was different which supports the assumption that particle diffusion is random. When I plotted multiple runs on the same graph, I observed that more space was filled in, showing that pollutants do not stay put. From my modeling, research, and observations, I conclude that pollution spreads across real and imaginary borders through the process of diffusion and that if we don't all pay attention to what we are putting into our air supply, we will all suffer the consequences.