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Fluid mechanics of mathematics testing in Texas

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The performance of Texas high school students on mathematics exams is tightly connected to the level of poverty in the school. I will employ the coarse-graining techniques that lead from molecular motions to fluid mechanics in order to find how student scores evolve over time. I will show that the points of divergence between well-off and low-income kids are particularly clear when viewed as streamlines of a flow in the space of grade-level and score. The results can also be cast in the form of a Fokker-Planck equation, which highlights the separate roles of convection and diffusion. I will use the results the assess the plausibility of using charter schools, highly qualified teachers, and accountability systems as primary agents of school reform.