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Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
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Take the Long Way Home

Guide for Curriculum Unit 11.04.04
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This unit uses the tools of mathematics to quantify children's exposure to pollution from diesel exhaust. In order to alleviate the *de facto* segregation created by longstanding residential patterns, many school districts encourage school choice, through interdistrict magnet schools. Unfortunately, school choice has increased the number of students who need to take a bus to school rather than get there on foot. One of the goals of our investigation will be to look at the transportation question and examine the extent of busing required if students were assigned to schools by neighborhood versus by magnet choice.

The problem of the air quality of school buses has received attention in the last ten years. A study by Environment and Human Health, *Children's Exposure to Diesel Exhaust on School Buses*, led to sweeping changes in the oversight of school bus emissions as well as new legislation regarding the idling of school buses. Diesel emissions are among the worst contributors to air pollution. Due to school choice, students in urban districts may be more likely to commute by bus and experience this exposure. Urban students may also be more likely to have asthma than their suburban counterparts.

This unit will be a teaching tool in the statistics curriculum, beginning with the examination of air pollution data. Students will look at summary statistics and decide how best to describe the distributions. Students will collect data through direct surveys and examine issues of bias and sampling designs. Finally, students will create probability models to examine how likely it is that a random student will experience negative health effects as a consequence of his or her commute to school.

(Recommended for Statistics, Environmental Science, and Health, grades 10-12)

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