



Center for the Environment at Catawba College

Campaign for Clean Air

Clean Air in the Classroom

Stage 2 Activity 2

“Undercover Math”

Overview

This lesson is for classes that are involved in the “no-idling campaign” at their schools. This lesson takes the data collected in the “Undercover Count” section and analyzes it for trends. Later this data will be compared with the “Final Count” to measure the campaign’s success.

North Carolina Standard Course of Study

This lesson meets seventh grade math competency goals 1.01, 1.02, 4.01, and 4.02.

Learning Objectives

Students Will Be Able To collect and organize idling time data in the car line at school

SWBAT use this data to calculate totals, maximum and minimum values, and mode and mean values of idling times

SWBAT use the data to make assumptions about the total amount of idling occurring daily, weekly and yearly at school

SWBAT report data through whisker and box plots

Materials

- “Daily Idling Time Tally Sheet” with data filled in
- “Daily Vehicle Counter Talley Sheet” with data filled in
- Way to analyze data (pen and paper, calculator, spreadsheet software)

Procedures

- 1.) With the data collected from the “Daily Idling Time Tally Sheet,” students can begin to analyze the data.
- 2.) Here is a list of possible calculations:
 - a. Total idling time (all vehicles and by each type)
 - b. Average (Mean) idling time, Median and Mode idling time (all vehicles and/or by type)

Note: When finding averages and other calculations in this section, make sure the number of vehicles students use is the number of vehicles whose idling time was counted, not the total number of vehicles in line.

- c. Maximum and Minimum idling times
- d. Percentages of data (by vehicle type)
- e. Look at “Emission Facts” <http://www.epa.gov/oms/consumer/f98014.pdf> to get the breakdown of different pollutants and use the idling times to calculate grams of pollutant per day, week, month and/or year. (Vehicles are listed by type)

3.) With the data collected from the “Daily Vehicle Counter Tally Sheet,” students can make projections on total vehicle idling using the following possibilities:

a. Ratios/Percentages
$$\frac{\text{counted idling time}}{\# \text{ vehicles measured for idling}} = \frac{\text{projected idling time}}{\text{total vehicles counted}} \quad (\text{daily idling})$$

b. Multiply data from “a.” to get weekly, monthly and yearly idling times.

4.) Much of this data can also be displayed in box plots and whisker plots. Quartiles will need to be found, if using pen and paper. You may also use graphing calculators and/or Excel to make these graphs.

Note: Reference for statistical definitions http://www.mathgoodies.com/lessons/toc_vol8.html

Assessment

5.) Grade calculations for accuracy.

Note: We did not provide a worksheet for this lesson, just suggestions, in hopes that each instructor will use the activities listed to fit their own needs.