

Math 9

Statistics and Probability: Air Quality

Abstract

Using an interdisciplinary approach, students will increase mathematical skills of data collection and analysis and gain an understanding of local issues and increased awareness of air quality.

Logistics

Time Required

- **Class Time:** Two 60-75 minute classes.
Extensions will take additional time.
- **Prep Time:** 20 minutes

Materials

- Separate graph paper

Classroom Requirements

- Computer(s) with Internet access

Prescribed Learning Outcomes:

- Data Analysis
- D1 Describe the effects of the following factors on the collection of data:
 - bias
 - cost
 - cultural sensitivity
 - use of language
 - time and timing
 - ethics
 - privacy
- D2 Select and defend the choice of using either a population or a sample of a population to answer a question.
- D3 Develop and implement a project plan for the collection, display, and analysis of data by:
 - formulating a question for investigation
 - choosing a data collection method that includes social considerations
 - selecting a population or a sample
 - collecting the data
 - displaying the collected data in an appropriate manner
 - drawing conclusions to answer the question



Classroom implementation:

1. **Have a brief discussion about air quality in the region, (about 5-10 minutes).**

Help students identify that local issues can be relevant to and incorporated into our learning, even mathematics. Discuss contributors to pollutants in the airshed. For example, transportation, industry, restaurants, tire treading companies, open burning, heating and energy use, fugitive dust, forest fires, agricultural activities and so on. Refer to the Background section of the resource package for more information on air pollutants, their sources and impacts.

2. **Invite students in to the process of creating a project plan** for collection, display and analysis of data connected to the topic of air quality.

3. **As a class, formulate a question for investigation.**

For instance, students could choose to investigate the type of transportation teachers and/or parents use. This could be an assessment of the type of vehicles found in the parking lot such as economy size car, mid-sized car, SUV, van, utility van or truck, and specifying if the vehicles are gasoline, diesel, hybrid or electric. Students could briefly research fuel economy and emissions of the above classes of vehicles. Information could be collected via survey.

Other questions that could include: idling time per driver per day, number of students who carpool or use active transportation to get to school, cost of fuel per month, distance to travel to school, households that heat with firewood, prevalence of asthmatics in a population, and so on.

4. **Choose a data collection method.**

5. **Select a population or a sample.**

6. **Discuss how bias, cost, cultural sensitivity, use of language, time and timing, ethics and privacy apply to the question of investigation.**

7. **Display the collected data in an appropriate manner.**

There are numerous ways to graph data. Have students to recall the following types of graphs:

Circle graph – shows percentages, fractions or parts of a whole

Stem-and-leaf graph – shows the number in a large data set arranged by place value


Bar graph – compares two or more values

Double bar graph – compares two sets of data

Pictograph – compares two or more values that are multiples of a number

Line graph – shows a value that changes over time

8. **Have students independently or in groups draw conclusions regarding the question.**



For additional lessons and to complete an evaluation survey, visit: www.fvrd.ca/airquality

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