

Lab Report: Air Pollution

Section: _____

Team number: _____

Team members: _____

Part 1: Measuring Particulates

Exercise: Suppose a particle is in the shape of cube, which measures 1.2 microns on each side. For this exercise assume that the volume is the only significant environmental property of the particle. What is the “diameter” of this particle?

Part 2: The Size Distribution Function

1. Describe clearly the meaning of the integral $\int_{p_1}^{p_2} \frac{dN}{dp} dp$ in the context of this application.
2. Write down an integral that represents the number of particles that the current standard of 10 microns would cause to be removed from the air.
3. Write down an integral that represents the number of additional particles (*per cm³*) that would be removed if the standard were changed from 10 microns to 2.5 microns.

Part 3: Working with Real Data

1. Set up an integral that represents the total number of particles per cubic centimeter found in the atmosphere above Pasadena. Estimate the value of this integral, and explain how you made the estimation. Be sure to show any expressions you compute on your calculator (but use standard mathematical notation—not TI-83 notation). Is your estimate an over or under estimate? How do you know?

2. How many particles per cubic centimeter lie between .05 microns and .55 microns? Show the expression which must be computed and state briefly how you approximated its value.

3. Under the proposed 2.5 micron standard, all particulate matter of diameter 2.5 microns and above should be filtered out of the atmosphere. What per cent of the total number of particulates would have been removed had this standard been followed in Pasadena? Explain briefly how you computed your answer.