

Name:

Lesson Title:

Counting with a Purpose: Using Math to Investigate Toxic Air Emissions in a Community

Task Context:

In the lesson, we will explore the impacts of toxic air emissions on an economically disadvantaged community.

Going Deep with Mathematics:

- **Measurement and Data:** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.
- **Geometry:** Know the formulas for the area and circumference of a circle and use them to solve problems;

Task Context:

1. Students in a class at Winton Hills Academy live in 5 different zip codes, which include 45217, 45232, 45224, 45216, and 45212. The table represents the number of toxic air emissions that each of the zip codes are exposed to. Note: If the zip code is not on the table, it indicates that 0 pounds of toxic air emissions were reported.

a. Create a graph to represent the air emissions in each of the five zip codes on a separate sheet of paper.

b. What do you notice about your graph? What do you wonder?

Zip Codes	Toxic Air Emissions (in pounds)
45225	3584
45231	15
45215	4506
45217	1123
45227	52345
45229	912
45233	303
45204	13501
45232	75281
45209	1509
45216	1312
45237	4384
45212	11635

2. Task Context: Keisha lives in the 45232 zip code. Each day after school, Keisha joins several of her classmates to play in the grass area at Emery Park on Este avenue, near all six facilities.

Table 2 shows the distance (in yards) between Keisha's play area and each facility. When a company has a chemical spill, residents within 1,000 feet are told to stay inside and turn it off if they have air conditioning. Some chemicals may cause eye, nose, and throat irritation, breathing difficulty, wheezing, chest pain, and severe sickness.

While Keisha and her classmates were playing at the park, the Emery Oleochemical facility had a chemical leak, and residents were told to “shelter in place.” Keisha and her classmates continued to play at the park because they were unaware of the leak.

- a. Determine if they were exposed to the hazardous chemical spill.
- b. How did you solve the task? What strategy did you use?
- c. Compare your strategy with your shoulder partner.

3. Reflection: Choose one or more of the prompts and respond to it in writing or aloud.

- Should something be done about the impacts that companies are having on communities? If so, what?
- Are people entitled to clean air?
- Whose interest should be considered more, companies or people who live in the community?

Table 2

Company	Distance from Keisha's Play Area (yards)
Sun Chemical (1)	2112
Emery Oleochemicals	528
BASF	528
Sun Chemical (2)	1760
Procter and Gamble	3696
Marathon	1232