

How Big is a Mole? – a Chemistry Project

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Introduction

The unit "mole" is used in chemistry as a counting unit for measuring the amount of something. One mole of something has 6.02×10^{23} units of that thing. The magnitude of the number 6.02×10^{23} is challenging to imagine. The goal of this project is to understand just how big a mole is. In this project, you will compare a mole of a familiar object to something with a huge magnitude. The specific project requirements are to solve two problems (from two different categories) and make a 14" by 22" poster *for each problem*. Example problems are listed for each of the four categories: distance, mass, volume, area. You may choose one problem from the examples given, but you must create the second problem yourself. You may also create both problems yourself. (Be sure to have your ideas for problems approved by your teachers *before* you start work on your posters.)

Project Components

The poster requirements are listed below. Read the project requirements carefully so that your final product will be accepted. Be sure to ask approval ahead of time if you have a good reason to deviate from the requirements. Note that any deviation must be approved before the presentation day.

1. Use 14" by 22" poster board or paper.
2. Include the following information:
 - a. Statement of the problem.
 - b. Researched data that are used as a basis for the calculation.
 - c. Calculation done correctly and clearly written out with units labeled.
 - d. Illustrations that relate to the problem. Be creative and appropriate for hanging in the classroom.
 - e. Bibliography (Cite sources used for information and illustrations. (Follow the NSHS references standards available for download from the library website.)
 - f. Your name and block
3. Make your posters easy to read.
4. Make good use of color and illustrations.

Evaluation

Your posters will be evaluated based on the quality of your presentation of your problems, and the quality of your work according to the project evaluation rubric. Does your poster show that you understand the magnitude of the problem well? Does your poster clearly depict your chosen problem to the viewer? If you need help in understanding the problems, please seek help during J-Block. Below are some hints for making a great poster:

- The poster must conform to the size specified.
- The title of the poster must be in the form of a question.
- The problem should be solved using dimensional analysis.

- The problem should be solved correctly.
- All units should be shown and correct.
- All work should be shown.
- You should include art work related to your question.
- You should include a list of resources on the front of the poster in MLA format.
- Your name, date turned in and class period should be on the front of the poster.
- The poster should be neat and organized.

Examples of Mole Project Problems

Category 1: Distance

1. A mole of Big Macs stacked up would reach from the earth to the moon and back how many times?
2. A mole of dollar bills joined end to end would encircle the earth how many times?
3. A mole of pop cans stacked on top of one another would reach from here to the sun and back how many times?
4. A mole of Twinkies placed end to end would encircle the planet Jupiter how many times?

Category 2: Mass or Weight

5. A mole of moles (the mammal) would have a mass how many times greater than the mass of the earth?
6. A mole of bowling balls would have a mass how many times greater than the mass of the moon?
7. A mole of cans of Spam would weigh how much more than all the gold in the U.S. Treasury?
8. A mole of elephants would weigh how much more than the moon?

Category 3: Volume

9. A mole of M&M's would fill how many holes the size of Lake Erie?
10. A mole of jelly beans would fill up how many buildings the size of the Empire State Building?
11. A mole of basketballs would cover the surface of the earth to a depth of how much?
12. A mole of marbles would cover the continental U.S. to a depth of how much?

Category 4: Area

13. A mole of 1 gallon cans of paint could cover every square inch of the surface of how many planets the size of the earth?
14. A mole of Hershey bars could cover every square kilometer of the surface of how many continents the size of Africa?
15. A mole of football fields could cover every square meter of the surface of how many moons?
16. A mole of pizzas could cover every square meter of the surface of how many continents the size of Antarctica?