BLOSSOMS at Home V

Do We Really Comprehend Avogadro's Number?

Key Words: Avogadro's Number, estimation, orders of magnitude, critical thinking, reflective learning
Grade levels: 7 – 12.

Dear Student@Home!~
Hi from MIT in Cambridge, Massachusetts, USA! If you had tons of marbles, about how many would it take to fill your school classroom, floor to ceiling? How about your living room at home? And you need to make estimations without a calculator!! Just pencil and paper. No cheating!

We have a special project for you to do over the next week. It builds from the MIT BLOSSOMS video lesson, **"How Big Is a Mole? Do We Really Comprehend Avogadro's Number?"** The motivation for this assignment is to improve your ability to create "ballpark" estimates of quantities, without using a calculator. Especially for those of you who might wish to pursue engineering and/or science, being able to "ballpark" magnitudes is a vitally important skill.

We want you to write a short report addressing the estimation and order-of-magnitude challenges we pose in here, both in this video lesson and in the questions below. Total estimated time to do all these things: Only 4 hours or less! Send me your report (300 words or less), I promise to read it, and send comments to you! Maybe you'll get a Gold Star from us. You might want to share your report with your teacher, and your friends as well!

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Do We Really Comprehend Avogadro's Number?

https://blossoms.mit.edu/videos/lessons/how_big_mole_do_we_really_comprehend_avogadro's_number

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For your report:

1. Watch the video, maybe twice! Did you find the complaining student's question funny? serious? disrespectful? At each break in the video please work out your own estimation in response to the challenge question. Include your logic, thought processes and estimates in your report.

For the following questions, we seek only approximate or "Ballpark" or "Order-of-Magnitude" answers. But we don't want to see only your final numbers. We want to see your logic that led you to those numbers. Have fun with these! ☺ You're developing an important skill!

2. Estimation: A mole of dollar bills joined end to end would encircle the earth how many times?
3. Estimation: A mole of elephants would weigh how much more than the moon?
4. Estimation: A mole of jelly beans would fill up how many identical Empire State Buildings?
5. Estimation: A mole of pizzas could cover every square meter of the surface of how many continents the size of Antarctica?
6. Estimation: How many moles of water have you consumed this week?
7. Final question: Make up your own interesting and real-life mole question and then show us your logic leading to an answer.