Counting by the Mole

Student Worksheet | g09_u07_w25

I can: use the mole as a counting unit, convert particles and moles with units, and model the scale of Avogadro's number.
Defined constant: $N_A = 6.02214076 \times 10^{23}$ mol^{-1} exactly in the SI.

1. Define one mole.

2. State Avogadro constant with units.

3. Why is mole like dozen but much larger?

4. Convert 2.00 mol to particles.

5. Convert 0.500 mol to particles.

6. Convert $3.01107038 \times 10^{23}$ particles to mol.

7. Choose conversion factor for particles to mol.

8. What does "formula units" count for NaCl?

9. What does "molecules" count for CO_2?

10. What does "atoms" count for He?

11. How many O atoms in 1.00 mol H_2O?

12. How many H atoms in 1.00 mol H_2O?

13. How many atoms total in 0.250 mol CH_4?

14. Explain why coefficient and subscript have different roles in particle count.

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15. Write a dimensional-analysis setup for 4.50 mol Cu atoms to atoms.

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16. Write a setup for $1.204428152 \times 10^{24}$ molecules to mol.

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17. Why should calculator digits be rounded to data precision even though N_A is exact?

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18. A class has 1.20×10^{24} beads. How many mol of beads?

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19. Compare 1 mol H_2O molecules with 1 mol CO_2 molecules; what count is same and what composition differs?

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20. Critique: “One mole always has the same mass.”
