Kinetic Molecular Theory and Gas Variables

Student Worksheet | g09_u09_w33

I can: use a particle model to relate pressure, volume, temperature, and amount of gas.
Guardrail: a particle model explains trends, not every collision, force, or real-gas condition. Use paper data cards only; sources in `sources.md`.

1. List two KMT claims about gas particles.

2. Define pressure using particle-wall collisions.

3. Name the four variables P, V, T, and n.

4. Predict pressure change if collision rate rises at constant volume.

5. Predict volume trend when temperature rises at constant pressure.

6. Explain why Kelvin, not Celsius, is used for gas-temperature ratios.

7. Data A: 1.00 L gas at 300 K becomes 450 K at constant pressure. Predict volume factor.

8. Data B: collision count per second rises from 20 to 35 at constant V,T. Predict pressure trend.

9. Draw/describe particles in a smaller volume at same T and n.

10. Explain why smaller volume can raise pressure.

11. At constant V,n, compare average kinetic energy at 250 K and 500 K.

12. Data C: two containers have same T,V; one has twice as many particles. Predict pressure relation.

13. Explain the difference between average kinetic energy and one particle's speed.

14. Which KMT assumption becomes less reliable at very high pressure?

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15. Why does a gas model not prove every collision is perfectly elastic in a real sample?

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16. A sealed syringe model is compressed. State a trend and a model limitation.

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17. A balloon data card warms from 290 K to 348 K at constant P. Find V_2/V_1.

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18. Explain why an open balloon may not follow a simple constant-n model.

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19. Critique: "Higher pressure means particles themselves got bigger."

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20. Write an evidence-based conclusion from a data card showing T rises while V rises at nearly constant P.
