



**MathsNET**

A joined up approach to  
teaching and learning  
mathematics

# The ideal gas

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- Explain how an ideal gas differs from a lattice gas
- How do the particles that make up an ideal gas interact.
- Give an expression for the Hamiltonian for a system of  $N$  ideal gas atoms
- Describe the set of microstates than an ideal gas can occupy



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- Give an expression for the partition function of a single gas atom and explain how you arrived at this expression
- Explain why Planck's constant appears in the expression for the partition function for an ideal gas
- Explain Gibbs paradox and how this problem is resolved in practice
- Explain how the well-known equation of state for the ideal gas is derived by taking suitable derivatives of the partition function