

## TABLE OF CONTENTS

### Licensing

## 1: Fundamental 1 - Measurable Properties

- 1.1: Non-Ideal Gas Behavior
- 1.2: Virial Equations

## 2: Extension 1.1 - Kinetic Molecular Theory

- 2.1: Kinetic Molecular Theory

## 3: Extension 1.2 - Microscopic Gas Models

- 3.1: Van der Waals' Equation

## 4: Fundamental 2 - Counting Configurations

- 4.1: The Distribution Function as a Summary of Experimental Results
- 4.2: Outcomes, Events, and Probability
- 4.3: Some Important Properties of Events
- 4.4: Applying the Laws of Probability
- 4.5: Combinatorics and Multiplicity

## 5: Fundamental 4 - Heat Transfer

- 5.1: Energy Basics

## 6: Fundamental 5 - Entropy

- 6.1: Entropy

## 7: Extension 5 - Temperature

- 7.1: The Molecular Basis for Understanding Simple Entropy Change

## 8: Fundamental 6 - Work

- 8.1: Work
- 8.2: Gas Expansion

## 9: Fundamental 7 - Variable Changes

- 9.1: Partial Differentiation
- 9.2: Functions of Two Independent Variables
- 9.3: The Total Differential

## 10: Extension 7 - Path Dependence

- 10.1: Exact Differentials

## 11: Fundamental 8 - Energy Transformations

- 11.1: Internal Energy
- 11.2: Total Differential of the Internal Energy

## 12: Fundamental 10 - Processes

- 12.1: Reversible and Irreversible Pathways

## 13: Extension 10 - Cycles

- 13.1: Carnot Cycle
- 13.2: Entropy

## 14: Fundamental 11 - Boundary Changes

- 14.1: Helmholtz Energy

## 15: Extension 11 - Legendre Transforms

- 15.1: Differential Forms of Fundamental Equations

## 16: Fundamental 12 - Laboratory Conditions

- 16.1: Expressions for Heat Capacity
- 16.2: The Third Law of Thermodynamics

## 17: Extension 12 - Working Equations

- 17.1: The Maxwell Relations

## 18: Fundamental 13 - Composition Changes

- 18.1: Partial Molar Quantities
- 18.2: Chemical Potential
- 18.3:  $\Delta_r G$  is the rate at which the Gibbs Free Energy Changes with The Extent of Reaction
- 18.4: Molar Reaction Enthalpy

## 19: Extension 13 - More Cycles

- 19.1: How The Enthalpy Change for a Reaction Depends on Temperature

## 20: Fundamental 14 - Reaction Equilibrium

- 20.1: Prelude to Chemical Equilibria
- 20.2: Chemical Potential

## 21: Extension 14 - Temperature Dependence of Equilibrium

- 21.1: Temperature Dependence of Equilibrium Constants - the van't Hoff Equation

## 22: Fundamental 15 - Phase Equilibrium

- 22.1: Fundamentals of Phase Transitions
- 22.2: Phase Diagrams

## 23: Extension 15 - Phase Rule

- 23.1: Criterion for Phase Equilibrium

## 24: Fundamental 16 - Solution Equilibrium

- 24.1: Ideal Solutions - Raoult's Law
- 24.2: Thermodynamics of Mixing

## 25: Extension 16 - Vapor-Solution Phase Diagrams

- 25.1: Raoult's Law and Ideal Mixtures of Liquids
- 25.2: Phase Diagrams for Binary Mixtures
- 25.3: Liquid-Vapor Systems - Raoult's Law

## 26: Fundamental 17 - Colligative Properties

- 26.1: Colligative Properties

## 27: Extension 17 - Solid-Solution Phase Diagrams

- 27.1: Solid-Liquid Systems - Eutectic Points
- 27.2: Cooling Curves

[Index](#)

[Index](#)

[Glossary](#)

[Detailed Licensing](#)