

2022-23 Academic Pentathlon Science Resource Guide Outline

Section I. The Structure of Matter.....35%

- A. Introduction
- B. The “Scientific Revolution”
- C. Atomic Theory and Atomic Structure
- D. John Dalton’s Law of Partial Pressures and Atomic Theory
- E. Chemical Bonding and Intermolecular Forces
- F. Henry Cavendish and the Discovery of Hydrogen
- G. Molecular Models
- H. Nuclear Chemistry

Section II. States of Matter.....30%

- A. Introduction
- B. Gasses
- C. Jacques Charles and Charles’s Law
- D. Amedeo Avogadro and Avogadro’s Law
- E. Carl Wilhelm Scheele, Joseph Priestley, Antoine Lavoisier, and the Discovery of Oxygen
- F. Liquids
- G. Solids
- H. Phase Diagrams of One-Component Systems
- I. Joseph Black and the Discovery of Carbon Dioxide
- J. Solutions

Section III.

Reactions.....35%

- A. Introduction
- B. Types of Reactions
- C. Antoine Lavoisier, the Conservation of Mass, and the Birth of Modern Chemistry
- D. Acid-Base Reactions
- E. Precipitation Reactions
- F. Oxidation-Reduction Reactions
- G. Electrochemistry
- H. Luigi Brugnatelli and the Development of Electroplating
- I. Stoichiometry
- J. Joseph-Louis Proust and the Law of Definite Proportions
- K. Equilibrium
- L. Kinetics
- M. Thermodynamics
- N. Joseph Black and Latent Heat