Brainiacs Chemistry Olympiad Syllabus for Grades 7 and 8

Introduction to Chemistry
What is Chemistry?
Importance of Chemistry in daily life

States of Matter
Solids, liquids, and gases
Properties and differences
Changes in states of matter (melting, boiling, freezing, condensation)

Elements, Compounds, and Mixtures
Definition and examples
Differences between elements, compounds, and mixtures
Separation techniques (filtration, distillation, chromatography)

Atomic Structure
Introduction to atoms
Subatomic particles: Protons, neutrons, and electrons
Simple atomic models

The Periodic Table
Introduction to the periodic table
Groups and periods
Common elements and their symbols

Acids, Bases, Salts and Indicators
Properties of acids and bases
Natural and synthetic indicators
Simple neutralization

Matter and Its Classification
Pure substances and mixtures
Homogeneous and heterogeneous mixtures

Atomic Structure (Advanced)
Electronic configuration
Atomic number and mass number
Isotopes and their uses

Chemical Bonding
Ionic and covalent bonds
Basic examples of compounds (NaCl, H2O, CO2)

Chemical Reactions

Types of chemical reactions (combination, decomposition, displacement)
Balancing the equations
Law of conservation of mass

THERMOCHEMICAL AND REDOX REACTIONS

Thermochemical Reactions
Redox reactions

The Mole Concept and Stoichiometry

Mole calculations
Concept of molar mass and Avogadro's number
Relative atomic mass and molar mass
Empirical and molecular formula
Limiting reagent problems

Environmental Chemistry

Air and water pollution
Greenhouse gases
Steps to reduce pollution