PAREF Southcrest

Grade LEVEL 10 - (Chemistry)
Topic Outline
SY 2021 - 2022

Teacher: Naomi Claire Villar

1st Quarter

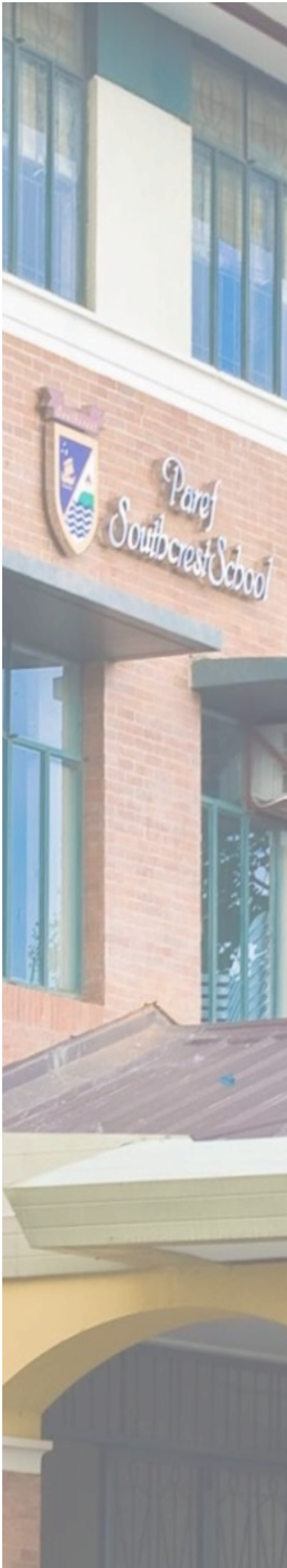
I. Introduction to Science/Chemistry
-definition, branches, history, importance
-scientific method, scientific attitudes
-laboratory tools and its uses
-investigatory project

II. Measurements
-accuracy and precision
-significant figures
-density measurement

III. Matter and its properties
-particulate nature of matter
-state of matter
-physical and chemical properties/changes
-extensive and intensive properties
-ways of classifying matter
-pure substance and mixtures
-elements and compounds
-homogeneous mixtures
-methods of separating mixtures into their component substances

IV. Atoms, molecules and ions
-atomic theories/models
-basic laws of matter
-atomic structure
-sub-atomic particles
-molecules, ions
-chemical formulas
-naming compounds

V. Electronic Structure of Atoms
-quantum mechanical description of atom
-Schrödinger model of hydrogen atom and wave function
-energy levels and orbitals
-Quantum numbers
-electron configuration
-Aufbau Principle



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-Pauli Exclusion Principle
-Hund's Rule
-Diamagnetism and Para magnetism
-Orbital diagrams

VI. Electronic Structure and periodicity
-electron configuration at the periodic table
-periodic trends

VII. Chemical Bonding
-Ionic
-Covalent
-Metallic

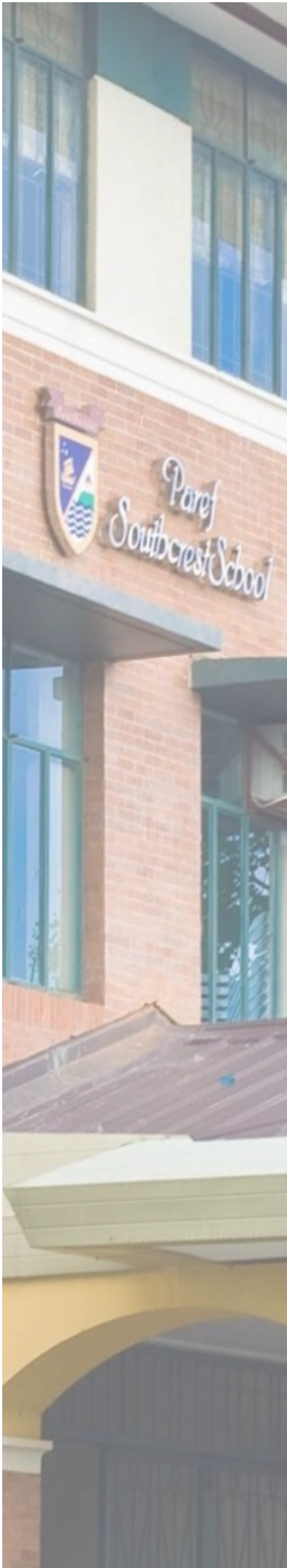
2nd Quarter

I. Introduction to Stoichiometry
-law of conservation with introduction to mole
-Chemical equations and patterns of chemical reactivity
- predicting products formed from different chemical equations
-Quantitative information from Balanced Equation

II. Reactions in Aqueous Solution
-General Properties
-Precipitation Reactions
-Acids, bases and Neutralization Reactions
-Oxidation-Reduction Reactions
-Concentration of Solution
-Stoichiometry and Chemical Analysis

III. Chemical Kinetics
-Factors that affect reaction rates
-Reaction Rates
-Concentration and Rate Laws
-The Change of Concentration with Time
-Temperature and Rate
-Reaction Mechanisms
-Catalysis

IV. Chemical Equilibrium
-Equilibrium Concept



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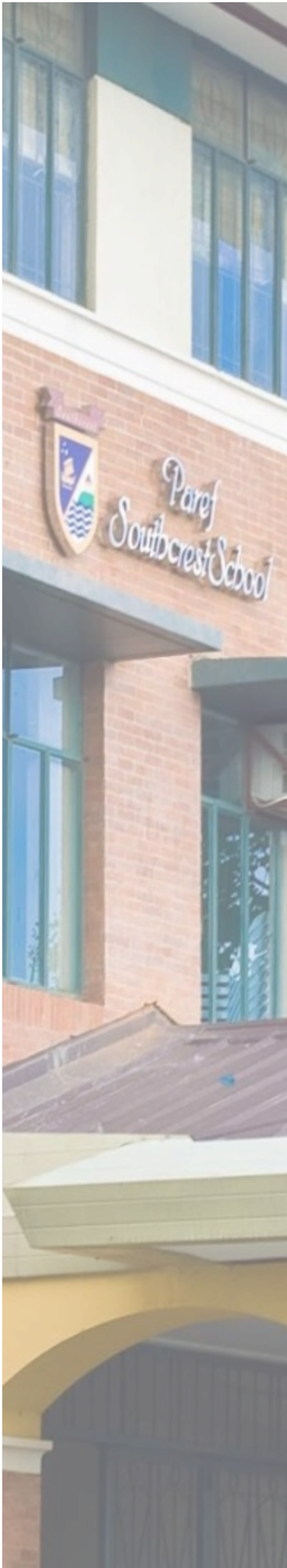
-Equilibrium Constants
-Heterogeneous Equilibria
-Le Chateliers Principle

V. Acid-Base Equilibria
- Brosted-Lowry Acids and Bases
- Autoionization of Water
- pH scale
-strong acids and bases
-weak acids and bases
-Ka and Kb
-Acid-Base Properties of Salt Solutions
-Acid-Base Behavior and Chemical Structure
-Lewis Acids and Bases
-Common-Ion Effect
-Buffered Solution
-Acid-Base Titrations
-Solubility Equilibria
-Factors that Affect Solubility
-Precipitation and Separation of Ions
-Qualitative Analysis for Metallic Elements

3rd Quarter

I. Molecular Geometry and Bonding
-Molecular shapes
-The VSEPR model
-Molecular shape and Polarity
-Covalent bonding and orbital overlap
-Hybrid orbitals
-multiple orbitals
-molecular orbitals

II. Gases
-Characteristics
-Pressure
-Gas Laws
-Ideal-Gas equation
-Further Applications of the Ideal-Gas Equation
-Gas mixture and partial pressures
-Kinetic-Molecular theory of Gases



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-Molecular effusion and diffusion
- Real Gases: deviation from Ideal Behavior

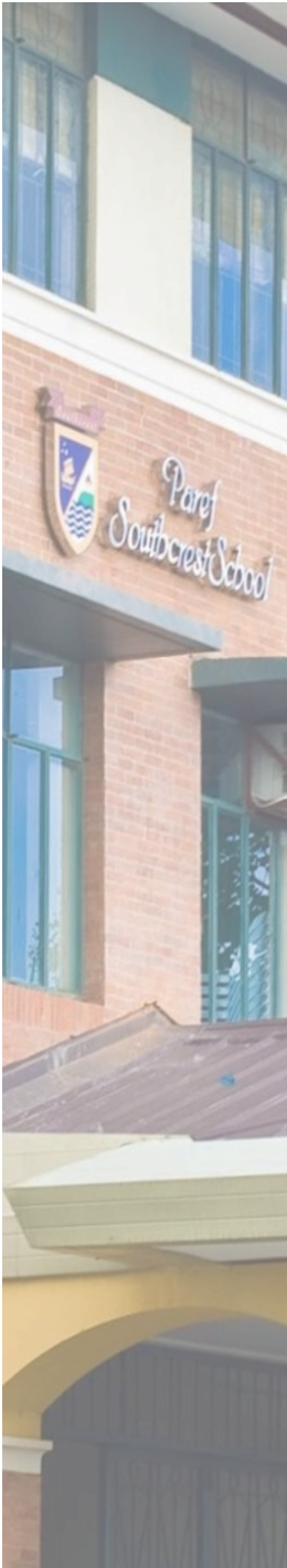
III. Liquids and Intermolecular Forces
-Molecular Comparisons of gases, liquids, and solids
-Intermolecular forces
-Select properties of liquids
-Phase changes
-Vapor pressure
-Phase diagrams
-Liquid crystals

4th Quarter

I. Electrochemistry
-oxidation states and oxidation-reduction reactions
-balancing redox equations
-voltaic cells
-cell potentials under standard conditions
-free energy and redox reactions
-cell potentials under nonstandard conditions
- batteries and fuel cells

II. Thermodynamics
-Nature of energy
-1st Law of Thermodynamics
-Enthalpy
-Calorimetry
-Hess's Law
-Enthalpies of Formation
-Foods and Fuels

III. Chemical Thermodynamics
-Spontaneous processes
-Entropy and the 2nd Law of Thermodynamics
-Molecular Interpretation of Entropy
-Entropy changes in chemical reactions
-Gibbs Free Energy
-Free Energy and Temperature
-Free Energy and the Equilibrium Constant



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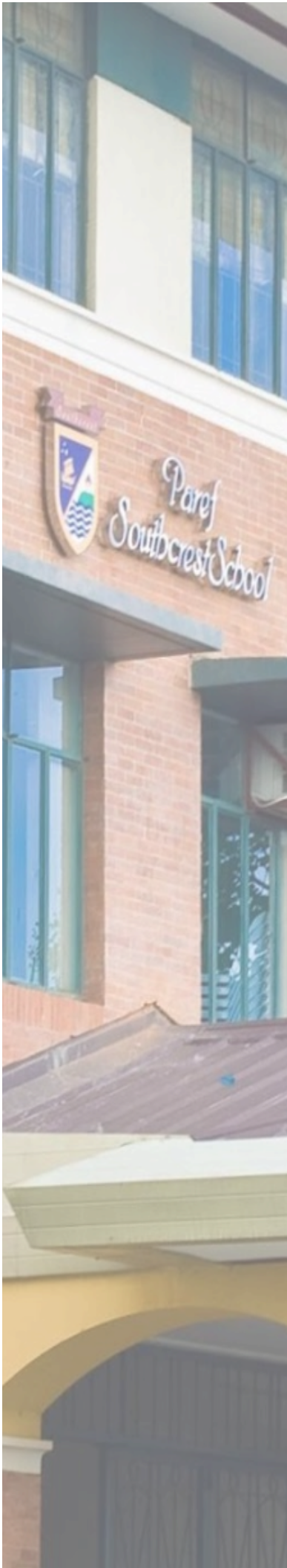

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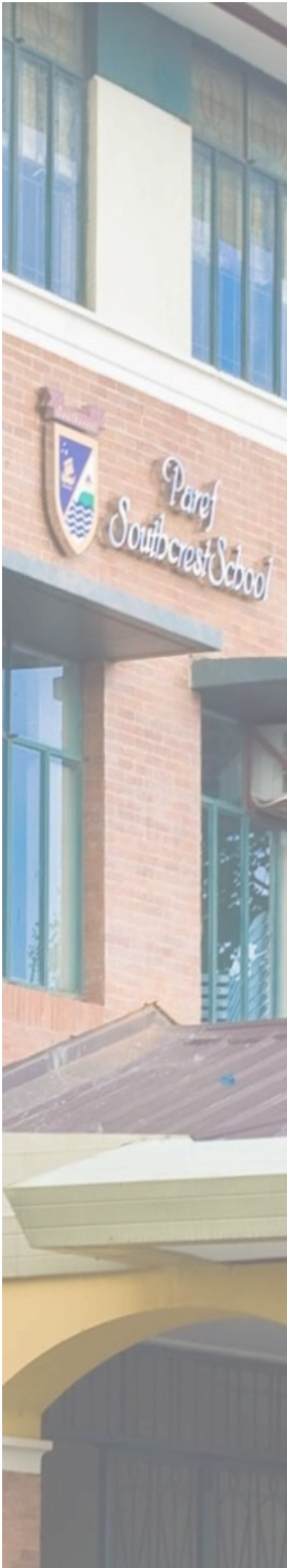

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