



Grade LEVEL 9 - (Biology)

Topic Outline

SY 2021 - 2022

Teacher: Fritzie Termoso

1st Quarter

I. Introduction to Biology

- A. Preparing to Study Biology
- B. Biology Overview
- C. What is Life?

II. Macromolecules

- A. Introduction to Macromolecules
- B. Carbohydrates
- C. Lipids
- D. Nucleic Acids
- E. Proteins

III. Organization of the Cell

- A. Introduction to Cells
- B. Prokaryotic and Eukaryotic Cells
- C. Tour of a Eukaryotic Cell
- D. Extracellular Structures and Cell Junctions

IV. Biological Membranes & Cell Transport

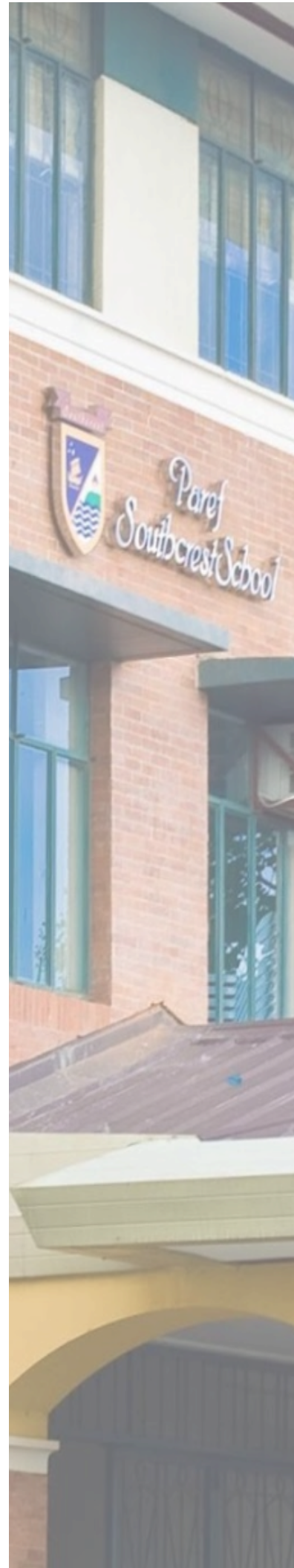
- A. The Plasma Membrane
- B. Passive Transport
- C. Diffusion and Osmosis
- D. Active Transport
- E. Bulk Transport

V. Cellular Respiration

- A. Introduction to Cellular Respiration
- B. Stages of Cellular Respiration
- C. Glycolysis
- D. Pyruvate Oxidation And The Citric Acid Cycle
- E. Oxidative phosphorylation
- F. Variations on Cellular Respiration

VI. Photosynthesis

- A. Intro to Photosynthesis
- B. The Light-dependent Reactions
- C. The Calvin Cycle
 - A. Photorespiration: C₃, C₄, and CAM plants
 - B. Metabolic Diversity
 - C. Photosynthesis in Plants and in the Environment





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II. Cell Signaling

- A. How Cells Signal to Each Other
- B. Communication in Single-celled Organisms

III. Cell Division

- A. Introduction to Cell Division
- B. The Cell Cycle and Mitosis
- C. Meiosis
- D. Cell Cycle Regulation, Cancer, and Stem Cells

2nd Quarter

I. Classical and Molecular Genetics

- A. Mendelian Genetics
- B. Variations on Mendelian Genetics
- C. Chromosomal Basis of Genetics
- D. Sex Linkage, Chromosomal Mutations, & Non-nuclear Inheritance
- E. Molecular Basis of Genetics

II. DNA: The Genetic Material

- A. Structure of DNA
- B. Discovery of DNA
- C. DNA Replication

III. The Central Dogma of Life

- A. Central Dogma and the Genetic Code
- B. Transcription
- C. Translation

IV. Gene Regulation

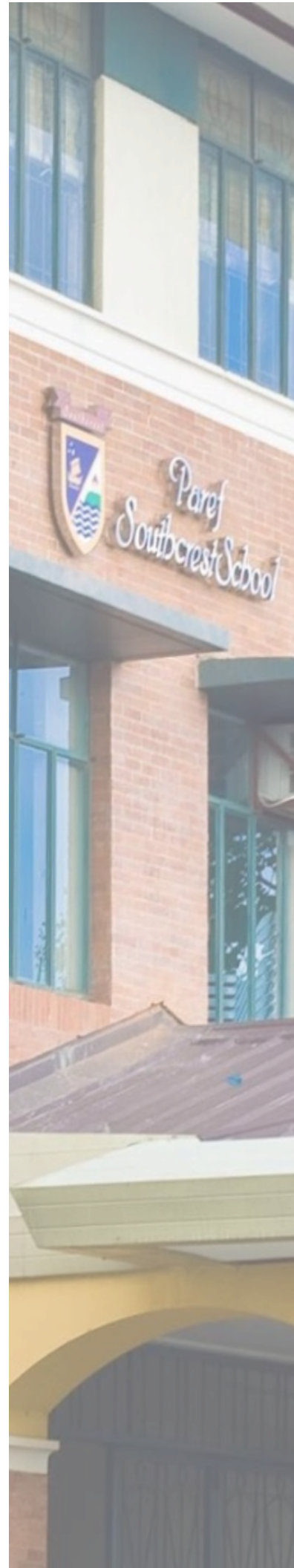
- A. Gene Regulation in Bacteria
- B. Gene Regulation in Eukaryotic Cells

V. Biotechnology

- A. Intro to Biotechnology
- B. DNA Cloning
- C. DNA Analysis Methods
- D. Stem Cells

VI. Developmental Biology

- A. Development & Differentiation
- B. Signaling & Transcription Factors in Development





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C. Apoptosis

VII. Virus, Bacteria and Archaeans

- A. Bacteria and Archaea
- B. Viruses

VIII. Protists

- A. Protistan Diversity
- B. Evolution of Eukaryotes
- C. Excavates
- D. Chromalveolates
- E. Rhizarians
- F. Archaeplastids
- G. Unikonts

3rd Quarter

I. Evolution and The Tree of Life

- A. Evolution and Natural Selection
- B. Population Genetics
- C. Speciation and Evolutionary Trees

II. History of Life on Earth

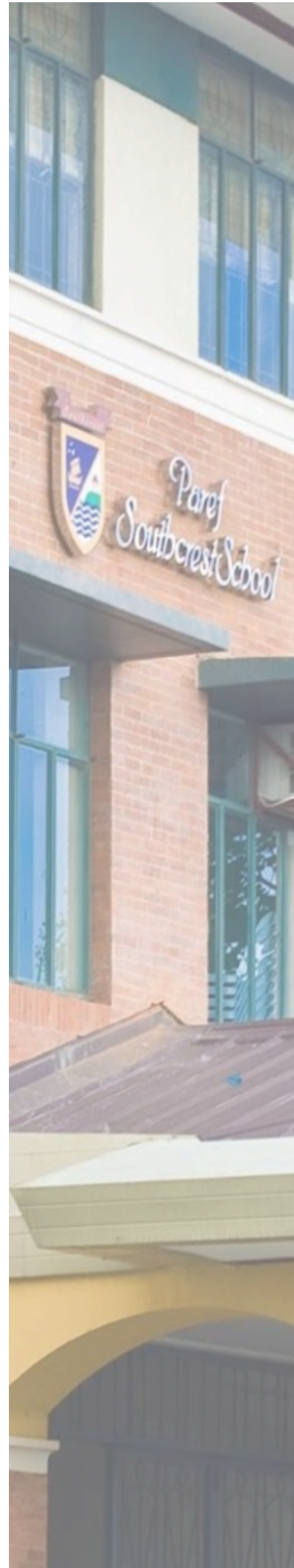
- A. Formation of Earth and Early Life
- B. The Diversification of Life
- C. Radiometric Dating

III. Plant Diversity

- A. Evolution of Plants on Land
- B. Plant Structure Growth and Development
- C. Seedless Plants
- D. Seed Plants

IV. Overview of Animal Diversity

- A. Animal Characteristics and Adaptations
- B. History of Animals
- C. New Views of Animal Phylogeny
- D. Invertebrates
- E. Vertebrates





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V. Animal Structure and Function

- A. Tissues, Organs and Organs Systems
- B. Regulating the Internal Environment
- C. Regulating Body Temperature

4th Quarter

A. Circulatory System

- a. Evolution
- b. Types of Circulatory System
- c. Parts and Functions
- d. The Circulation Pattern
- e. Cardiovascular Disease

B. Lymphatic and Immune Systems

- a. Lymphatic System Organs
- b. Evolution of Immune Responses
- c. Innate and Adaptive Responses
- d. Response to Disease, Immune Failures and Harmful Reactions

C. Digestive Systems and Nutrition

- a. Nutritional Styles and Adaptations
- b. The Vertebrate Digestive System
- c. Energy Requirement
- d. Energy Metabolism

D. Respiratory System

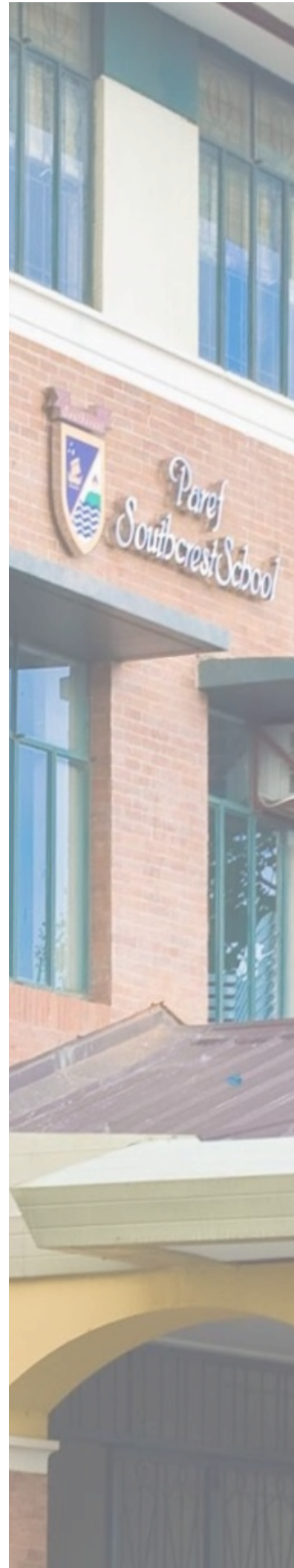
- a. Adaptations for Gas Exchange
- b. Respiratory Surfaces
- c. The Mammalian Respiratory System

E. Excretory Systems

- a. Excretion in Vertebrates and Invertebrates
- b. Urinary System in Mammals
- c. Parts and Functions
- d. Processes and Disorders

F. Nervous System

- a. Invertebrate and Vertebrate Nervous System
- b. Neurons: parts, functions, processes and types
- c. The Central Nervous system
- d. The Peripheral Nervous System





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e. Effects of Drugs

G. Endocrine System

- a. Endocrine Regulation
- b. Hormone
- c. Hypothalamus and Pituitary Gland
- d. Endocrine Glands and Hormones

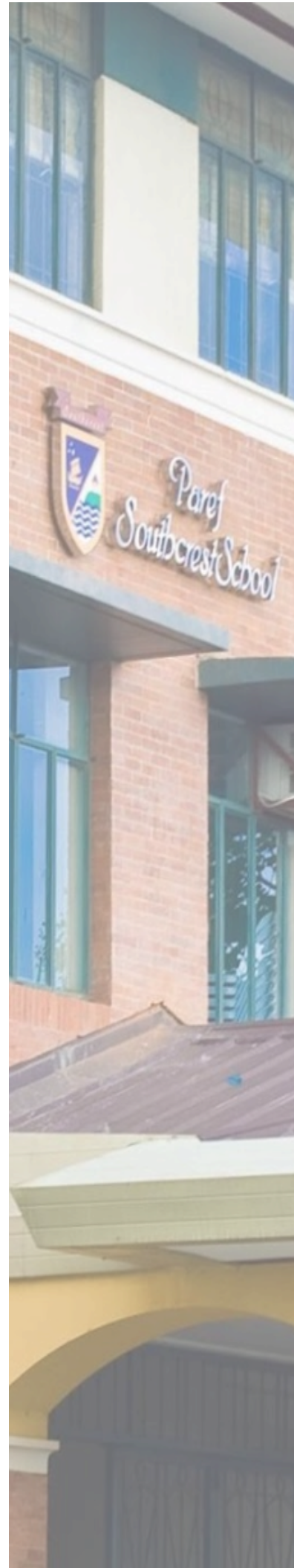
H. Protection, Locomotion and Support

- a. Parts and Functions of The Skeleton
- b. Parts and Functions of The Muscular System

I. Organisms & Environment

- a. The Biosphere
- b. Population & Communities
- c. Ecosystem Dynamics
- d. Anthrosphere

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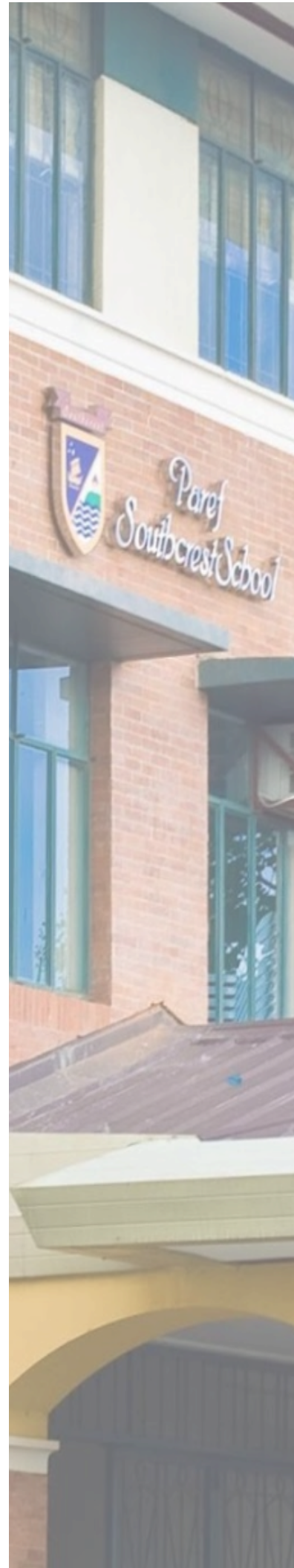




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