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# *Anatomy and Physiology Syllabus*

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- I. Introduction to Anatomy and Physiology
    - A) Branches of Anatomy
      - i. Gross (Macroscopic)
      - ii. Microscopic
        - 1. Cytology
        - 2. Histology
      - iii. Embryology
      - iv. Developmental Anatomy
    - B) Approaches to Studying Anatomy
      - i. Regional
      - ii. Systemic
    - C) Branches of Physiology
      - i. Renal
      - ii. Cardiology
      - iii. Neurology
    - D) Principle of Complementarity
    - E) Levels of Structural Organization
    - F) Functional Characteristics of Life
      - i. Responsiveness
      - ii. Digestion
      - iii. Maintenance of Boundaries
      - iv. Excretion
      - v. Metabolism
      - vi. Growth
      - vii. Movement
      - viii. Reproduction
    - G) Homeostasis, Control Mechanisms, and Imbalance
    - H) Anatomical Terminology
      - i. Directional Terms
      - ii. Regional Terms
      - iii. Planes and Sections
      - iv. Body Cavities and Serous Membranes
      - v. Abdominopelvic Regions vs. Quadrants
- (Several activities/labs are incorporated into this section of the unit.)

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- II. Essential Chemistry (Chemistry is a prerequisite for my course, so I expect students to already have an understanding of the periodic table, its elements, chemical bonds, mixtures, solutions, chemical reactions, and inorganic compounds.)
  - A) Organic Compounds
    - i. Carbohydrates
    - ii. Lipids
    - iii. Proteins
    - iv. Nucleic Acids
  - B) Detecting Organic Compounds Within Known and Unknown Substances (Lab)
- III. Cell Structure and Function
- IV. Cellular Transportation
  - A) Passive Transport
    - i. Diffusion
    - ii. Facilitated Diffusion
    - iii. Osmosis
      - 1. Hypertonic Solutions
      - 2. Hypotonic Solutions
      - 3. Isotonic Solutions
  - (Lab)
  - B) Active Transport
    - i. Solute Pump (Sodium/Potassium Pump\_
    - ii. Endocytosis
      - 1. Phagocytosis
      - 2. Bulk Phase Endocytosis
      - 3. Receptor Mediated Endocytosis
    - iii. Exocytosis DNA Processes
  - C) Replication and Replication Enzymes
  - D) Gene Expression
    - iv. Translation
    - v. Transcription
- V. DNA Processes
  - A) Replication and Replication Enzymes
  - B) Gene Expression
    - i. Translation
    - ii. Transcription

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### VI. Cell Cycle

#### A) Interphase

- i. Gap 1
- ii. S Phase
- iii. Gap 2

#### B) M-Phase and Cytokinesis

- i. Prophase
- ii. Metaphase
- iii. Anaphase
- iv. Telophase

#### C) Developmental Changes Occurring Within Cells

- i. Differentiation
- ii. Hyperplasia
- iii. Atrophy
- iv. Aging and Telomers

### VII. Introduction to Histology

#### A) Epithelial Tissue

- i. Characteristics of Epithelial Tissue
- ii. Identification and Classification of Epithelial Tissue
  1. Simple Squamous Epithelial Tissue
  2. Simple Cuboidal Epithelial Tissue
  3. Simple Columnar Epithelial Tissue (non-ciliated)
  4. Simple Columnar Epithelial Tissue (ciliated)
  5. Pseudostratified Columnar Epithelial Tissue
  6. Stratified Squamous Epithelial Tissue
  7. Stratified Cuboidal Epithelial Tissue
- iii. Locations and Functions of Tissues (Lab)
- iv. Glandular Epithelial Tissue
  1. Endocrine Glands
  2. Exocrine Glands

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- B) Connective Tissue
  - v. Characteristics of Connective Tissue
  - vi. Structural Elements of Connective Tissue
  - vii. Identification and Classification of Connective Tissue
    - 1. Embryonic Connective Tissue
    - 2. Connective Tissue Proper
      - a. Loose Areolar Connective Tissue
      - b. Dense Regular Connective Tissue
      - c. Dense Irregular Connective Tissue
      - d. Adipose Tissue
    - 3. Cartilage
      - a. Hyaline Cartilage
      - b. Elastic Cartilage
      - c. Fibrocartilage
    - 4. Osseous Tissue
    - 5. Blood
- C) Muscle Tissue
  - i. Skeletal/Voluntary/Striated
  - ii. Visceral/Involuntary/Smooth
  - iii. Cardiac
- VI. Nervous Tissue
  - iv. Neurons
  - v. Neuroglia
- D) Developmental Changes of Tissue
  - i. Germ Layers
    - 1. Ectoderm
    - 2. Mesoderm
    - 3. Endoderm
- VIII. Skeletal System
  - A) Functions
    - i. Support
    - ii. Protection
    - iii. Movement
    - iv. Storage of Minerals
    - v. Blood Cell Production
  - B) Classification of bones
    - i. Long
    - ii. Short
      - 1. Sesmoid
    - iii. Flat
    - iv. Irregular

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### C) Microscopic Anatomy

- i. Osteon (Haversian System)
- ii. Concentric Lamellae
- iii. Osteocytes
- iv. Lacuna
- v. Canaliculi
- vi. Interstitial Lamellae
- vii. Circumferential Lamellae
- viii. Haversian Canal
- ix. Volkman's

### D) Macroscopic Anatomy

- i. Epiphysis
  1. Articulating Cartilage
  2. Spongy Bone
  3. Epiphyseal Plate
- ii. Diaphysis
  1. Medullary Cavity
  2. Periosteum
  3. Endosteum
  4. Compact Bone

### E) Bone Markings

- i. That Serve as Muscle or Ligament Attachment
  1. Tuberosity
  2. Crest
  3. Trochanter
  4. Tubercles
  5. Epicondyle
  6. Spine
  7. Process
- ii. That Form Joints
  1. Head
  2. Condyle
- iii. That Allow Blood Vessels and/or Nerves to Pass Through
  1. Fossa
  2. Fissure
  3. Foramen
  4. Meatus
  5. Groove

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### F) The Axial Skeleton

- i. Skull Bones and Their Bone Markings
- ii. Vertebrae and Their Bone Markings
- iii. Thorax and Associated Bone Markings

### G) The Appendicular Skeleton

- i. Pectoral Girdle and Bone Markings
- ii. Humerus and Bone Markings
- iii. Radius/Ulna Bone Markings
- iv. Carpals/Metacarpals/Phalanges
- v. Pelvic Girdle and Bone Markings
- vi. Femur and Bone Markings
- vii. Patella
- viii. Tibia/Fibula and Bone Markings
- ix. Tarsals/Metatarsals/Phalanges
- x. (Lab)

### H) Joints and Movements Produced

- i. Synarthroses
- ii. Amphiarthroses
- iii. Diarthroses
- iv. Fibrous
- v. Cartilaginous
- vi. Synovial
  1. Ball and Socket
  2. Hinge
  3. Condylloid
  4. Pivot
  5. Plane
  6. Saddle

### I) Homeostatic Imbalances

### J) Developmental Changes