MAJOR THEMES OF ANATOMY AND PHYSIOLOGY

1.1 The scope of Anatomy and Physiology

- **Anatomy** is the study of structure, and **physiology** is the study of function.
  - These approaches are complementary and never entirely separable.
  - Together, they form the bedrock of the health sciences.
- Physiology lends meaning to anatomy --> Anatomy makes physiology possible.
- There are several ways to examine the structure of the human body.
  - Simplest: **Inspection**: simply looking at the body's appearance, as in performing a physical from surface appearance.
  - **Palpation**: feeling a structure with the hands.
  - **Percussion**: the examiner taps on the body, feels for abnormal resistance, and listens.
  - **Dissection**: Carefully cutting and separating tissues to reveal their relationships.
    - Cadaver: dead human body.
  - **Comparative anatomy**: The study of multiple species in order to examine similar trends.
  - **Exploratory Surgery**: Opening the body and taking a look inside to see what is going on.
  - **Medical imaging**: Methods of viewing the inside of the body without surgery.
    - **Radiology**: Branch of medicine concerned with imagery.
  - **Gross anatomy**: Structures that can be seen with the naked eye.
  - **Histopathology**: The microscopic examination of tissues for signs of disease.
  - **Cytology**: The study of the structure and function of individual cells.
    - **Ultrastructure**: refers to fine detail, down to the molecular level, reveals the arrangement of components within a structure.
  - **Comparative physiology**: The study of how different species have solved problems of growth, development, and reproduction.
• **Positive feedback and Rapid Change**
  - **Positive feedback** is a self-amplifying cycle in which a physiological change leads to another change that amplifies the initial change, rather than producing the corrective effects of negative feedback.
  - Normal way of producing a rapid change
  - Frequently, positive feedback is a harmful or even life-threatening process. To prevent this, the body can change the internal state of the body to something far from its homeostatic range.

• **Gradients and flow**
  - Matter and energy tend to flow down gradients.
  - **A physiological gradient**: a difference in chemical concentration, electrical charge, or other properties between one point and another.
    - **Down the gradient**: If matter or energy moves from the point where they are in higher concentration to where they are in lower concentration (does not require energy)
    - **Up the gradient**: Lower --> higher concentration (does require energy)