ANATOMY

1. **DESCRIPTION:** This event encompasses the anatomy (structure and function) of the muscular and **respiratory** systems and the effects of aging and diseases on them.

   A TEAM OF UP TO: 2 **APPROXIMATE TIME**: 50 Minutes

2. **EVENT PARAMETERS**: Each **participant** must bring a writing implement and **may** bring a non-programmable, non-graphing calculator. Each team may bring one 8.5" x 11" two-sided page of notes that contain information in any form from any source**.**

3. **THE COMPETITION**: Students should know the basic anatomy of the **muscular and respiratory** systems and how aging and specific diseases affect them. Process skills expected may include data collection, making observations, inferences, predictions, calculations, analyses and conclusions. The test may include various formats (e.g., timed stations, written test, slides, etc.) for the following topics:

   a. **MUSCULAR SYSTEM - See www.soinc.org for List of Skeletal Muscles**. **All levels should know**:

      i. The interaction of the skeletal and muscular systems (i.e., bones, joints, tendons, and muscles) to allow movement.
      ii. Muscle fibers -the cellular and gross anatomy of skeletal muscle, cardiac muscle and smooth muscle.
      iii. The function and characteristics of muscle tissue.
      iv. Location, identification, and function of the major skeletal muscles on the List of Skeletal Muscles.
      v. Effect of exercise on the muscular system.
      vi. Muscle and tendon injuries and their prevention (i.e., Strains and Sprains).
      vii. The diseases on each level from the cell to the whole person as listed: Poliomyelitis, Muscular Dystrophies, Myasthenia gravis, **myositis.**
      viii. The effects of exercise on the cellular and gross anatomical structure of the muscular system.

      National Level Only:

      ix. Location, origin, insertion and function of the muscles on the List of Skeletal Muscles.
      x. Understand the cellular components involved in muscle contraction and the neuromuscular junction.
      xi. Understand muscle sensory systems (e.g., spindles and Golgi tendon organs).
      xii. Understand the anatomy and function of cardiac and smooth muscle roles in the body.
      xiii. Additional diseases: Carpal Tunnel Syndrome, Fibromyalgia **and tetanus.**
      xiv. Treatment and prevention of all described diseases.

   b. **RESPIRATORY SYSTEM - All levels should know:**

      i. Anatomy of the Respiratory System – Principal organs, their structure and function
      ii. Functions of the Respiratory System
      iii. Mechanisms of Pulmonary Ventilation
      iv. Patterns of Breathing
      v. Measures of Pulmonary Ventilation
      vi. How exercise and high altitude affect the respiratory system
      vii. Understand disorders: COPD, asthma, emphysema, pneumonia, sleep apnea

      

      National Level Only:

      viii. Additional diseases/disorders to know: tuberculosis, pulmonary edema, **bronchitis**
      ix. Treatments and/or prevention for all conditions listed above (drugs, surgery, etc.)
      x. Regulation of the Respiratory System

4. **SCORING**: High score wins. Selected questions/quality of free-response answers will be used to break ties.

Recommended Resources: All reference and training resources including the **Bio/Earth CD** are available on the Official Science Olympiad Store and Website at http://www.soinc.org

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