

SCIENCE OF FITNESS – ANATOMY & PHYSIOLOGY

1. **DESCRIPTION:** This event encompasses the anatomy of the **cardiovascular**, muscular, and nervous systems including aspects of physical activity and fitness

A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

2. **EVENT PARAMETERS:** Teams may bring non-programmable calculators (but no electronically stored data) and handwritten or printed resources that are punched and attached to the rings of a 1" binder that has an area no larger than 12" x 12" x 1.5".

3. **THE COMPETITION:** This competition will include questions relating to the following areas:

- a. **Cardiovascular System:**

- i. Anatomy and physiology of the cardiovascular system
- ii. The Heart - chambers and valves of the heart, electrical stimulation of myocardial tissue, pacemaker tissue, interpreting ECG (EKG) readings on strips
- iii. Blood Vessels –structure and function of arteries, arterioles, veins, venules, capillaries, including the functionality of Starling's forces in the capillaries
- iv. Blood - plasma, hematocrit, red blood cells, oxygen transport, hemoglobin and cooperative binding of oxygen, platelets and blood clotting, regulation of blood plasma volume and acidity, blood typing & basic genetics of ABO, Rh, blood types
- v. Measurement of the pulse rate and blood pressure with appropriate instrumentation
- vi. Calculations include systolic and diastolic pressure, mean arterial pressure, stroke volume & cardiac output
- vii. Effects of exercise, smoking, alcohol, caffeine, and drugs on the cardiovascular system
- viii. Understand disorders: Congestive Heart Failure, Atrial Fibrillation, Myocardial Infarction, Atherosclerosis, Bradycardia, and Tachycardia

- b. **Skeletal System:**

- i. Basic anatomy of the skeletal system, including bones of the whole skeleton with focus on the axial and appendicular skeleton
- ii. Types of joints and their functions

- c. **Muscular System:** Location and identification of the major skeletal muscles of the body including function.

- d. **Diseases:** Major diseases and disorders of the **cardiovascular (see a. viii.)**, muscular, and nervous system and ways to prevent them.

- e. **Nutrition:** Nutritional analysis of food, food pyramid and fuel sources, & interaction of exercise and nutrition in health. Effects of nutrition on the **cardiovascular**, muscular, & nervous systems.

- f. Nutritional and health components including nutritional and exercise concepts

- g. Process skills may include observations, classifications, inferences, predictions, calculations, data analysis, variable analysis, and conclusions.

4. **SCORING:** Points will be awarded for correct answers, high score wins. Selected questions may be used to break ties.