SCIENCE OLYMPIAD

1. **DESCRIPTION:** Students will use their investigative skills in the scientific study of disease, injury, health, and disability in populations or groups of people with a focus on the effects of population growth on public health outcomes.

   A TEAM OF UP TO: 2   **APPROXIMATE TIME:** 50 minutes.

2. **EVENT PARAMETERS:** Non-programmable calculators are permitted. **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:** (**Sample Problems and Resources** may be found at http://www.soinc.org)
   a. This event combines a basic understanding of biological and physical agents that cause disease with an ability to analyze, interpret, evaluate and draw conclusions from simple data and communicate results to peers. Students should be able to distinguish between infectious and non-infectious health burdens.
   b. A broad definition of health will be used for this event. Potential topics include health as well as illness (mental, physical, infectious, chronic, environmental, societal, genetic, injuries and health behaviors).
   c. This event will include questions based on:
      i. Data collection
      ii. Creating graphic displays of data
      iii. Interpreting trends and patterns of epidemiologic data
      iv. Communicating results
   d. Students will be presented with one or more descriptions of public health problems such as an outbreak of food poisoning, a cluster of cases of West Nile encephalitis or state data on bicycle injuries.
   e. Based on these descriptions, they will be expected to do the following:
      i. Generate hypotheses and recognize various fundamental study designs.
      ii. Evaluate the data by calculating and comparing simple rates and proportions.
      iii. Identify patterns, trends and possible modes of transmission, sources or risk factors.
      iv. Recognize factors such as study design or biases that influence results (especially for Division C - less for Division B).
      v. Propose interventions based on promoting positive health behaviors, eliminating or reducing risks of environmental exposures, or disrupting clearly identifiable chains of transmission.
      vi. Translate results/findings into a public health/prevention message for identified populations at risk.
   f. They will also be expected to:
      i. Define basic epidemiological and public health terms (e.g., outbreak, epidemic, pandemic, surveillance, risk, vector, fomite, zoonosis, etc.).
      ii. Recognize various categories of disease causing agents & give examples of illnesses caused by each.
      iii. Recognize and understand differences between the major groups of infectious agents (e.g., viruses, bacteria, protistans, fungi and animals).
      iv. Recognize examples of various epidemiologic and public health phenomena such as types of outbreaks and modes of transmission.
   g. Calculations and mathematical manipulations should be part of the competition. Data may be contrived or modified to make it more appropriate for this age group as long as it does not radically alter results or interpretation.
   h. Process skills may include hypothesis, observations, inferences, predictions, variable analysis, data analysis, calculations, and conclusions.
   i. The level of questioning for Division B and Division C competitions should reflect the age-appropriateness for two groups.
   j. The event format may be exam-based, station-based or a combination of both.

4. **SCORING:**
   a. Points will be assigned to the various questions and problems. Both the nature of the questions and scoring rubric should emphasize an understanding that is broad and basic rather than detailed and advanced.
   b. Depending on the problem, scoring may be based on a combination of answers, including graphs/charts, explanations, analysis, calculations, and closed-ended responses to specific questions.
   c. Points should be awarded for both quality and accuracy of answers, the quality of supporting reasoning, and the use of proper scientific methods.
   d. Highest number of points will determine the winner. Selected questions may be used as tiebreakers.