The STEM Showdown will consist of a series of online multiple-choice questions across three major topic areas in Epidemiology. A showdown participant will have 50-minutes to answer as many questions as possible.

The content covered by the Showdown this month is as follows:

Topic I: Background & Surveillance
  a. Understand the Clinical Approach (health of individuals) and Public Health Approach (health of populations)
  b. Understand the role of epidemiology in public health and the steps in solving health problems
  c. Understand the Natural History and Spectrum of Disease and the Chain of Infection
  d. Understand basic epidemiological and public health terms (e.g., outbreak, epidemic, pandemic, surveillance, risk, vector, etc.)
  e. Understand the role of Surveillance in identifying health problems, the 5 step Process for Surveillance and the types of surveillance

Topic II: Outbreak Investigation
  a. Analyze an actual or hypothetical outbreak
  b. Understand the Types of Epidemiological Studies – Experimental and Observational
  c. Be able to identify the Steps in an Outbreak Investigation
  d. Formulate case definition
  e. Interpret epi curves, line listings, cluster maps, and subdivided tables
  f. Recognize various fundamental study designs and which is appropriate for this outbreak
  g. Evaluate the data by calculating and comparing simple rates and proportions as attack rate, relative risk, odds-ratio and explaining their meaning
  h. Apply the Bradford Hill Criteria for Verifying the Cause of this outbreak
  i. High School (Division C) Only: Recognize factors such as study design/biases, errors, confounding that influence results
  j. High School (Division C) Only: Suggest types of control & prevention measures for this outbreak

Topic III: Patterns, Control, and Prevention
  a. Identify patterns, trends of epidemiologic data in charts, tables and graphs
  b. Using given data, calculate disease risk and frequency ratio, proportion, incidence proportion (attack rate), incidence rate, prevalence and mortality rate
  c. Understand the Strategies of Disease Control
  d. Understand Strategies for Prevention-the Scope and Levels of Prevention
  e. High School (Division C) Only: Propose a reasonable set of prevention strategies for a public health problem once the cause has been determined
  f. High School (Division C) Only: Identify the strengths and weaknesses of a set of proposed prevention strategies
Recommended Materials

- Each Showdown participant will need a computer with internet access, scratch paper, something to write with, and a stand-alone, non-programmable, non-graphing calculator (e.g., a TI-83 or NSPIRE)
- Showdown participants may use resources available to help them answer the questions asked during the Showdown. These resources could be a collection of notes on the topics listed below, copies of magazine or journal articles, a textbook, or any combination of these items.

Scoring

- High score wins.
- Ties will be broken using:
  a. The time it takes to complete the test; and
  b. The results to the questions indicated as tiebreakers.

Additional Resources

- The CDC Science Olympiad Disease Detectives page (https://www.cdc.gov/careerpaths/diseasedetectives/index.html)
- The Science Olympiad Store (store.soinc.org) carries the Disease Detectives CD and Bio/Earth Science CDs.
- Other resources can be found on the Disease Detective Events Pages at soinc.org.