MICROBE MISSION (B-C)

1. **DESCRIPTION:** Teams will answer questions, solve problems, and analyze data pertaining to viruses and single celled organisms.

   NUMBER OF PARTICIPANTS: 2   **APPROXIMATE TIME:** 50 Minutes

2. **EVENT PARAMETERS:** Students may use non-programmable calculators. 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**: The event may be run as stations. Students will be given questions pertaining to different types of microbes. Some questions/stations may involve the actual use of a microscope. If no microscopes are available, high quality photographs with appropriate scales may be used instead. About 40% of the questions should involve process skills such as: data interpretation from graphs and tables, use of a dichotomous key, drawing conclusions, calculations of mean, median, and growth rates, metric conversions, determining actual size of the organism, inferences, and making observations. Students may be asked to perform simple laboratory procedures (sufficient information will be provided at the appropriate stations). The content areas may include:

   Regional And State Tournaments (B & C)
   a. Different kinds of microscopes and their uses.
   b. Various parts of the light microscope and magnification determination
   c. Recognition and function of nucleus, mitochondria and chloroplasts, and their possible microbial origin.
   d. Differences (e.g., size) among viruses, bacteria, Archaea, fungi, and algal and animal like protists.
   e. Role of microbes in the decomposition of and the commercial production of various foods.
   f. Diseases caused by different kind of microbes and the treatment/prevention of these diseases.

   Division C (only)
   g. Estimation/calculation of size based on scales in pictures or microscopic information and amount of the visual field occupied.
   h. Properties and environments of Archaea.
   i. Roles of microbes in food spoilage and preservation.
   j. Names for and recognition of various bacterial shapes
   k. Gleaning of information from the scientific name of organism
   l. Gram stain uses and difference between gram+ and gram-
   m. Important aspects spores and cysts
   n. Growth curves; graph interpretation

   National Tournament (B & C)
   o. All material from state and regional level
   p. Importance and size of bacterial and fungal spores.
   q. Role of microbes in the formation/cause of plant diseases.
   r. Cause and economic aspects of algal blooms.
   s. Microbial competition.

4. **SAMPLE QUESTIONS:**
   a. Provide two differences among bacteria, viruses, and fungi.
   b. Using the following key, determine (from pictures) which cell, A, B, or C is considered an alga.
   c. Based on the following graph, determine which organism is best suited for growth in acid environment.
   d. A cell is observed through a light microscope at 4x magnification. The cell takes up about half of the visual, field. What is the approximate length of this organism?
   e. Students observe a Petri plate with many different colonies on it. Based on the color of the colony, how many different kinds of organisms do you detect? Which type of organism appears to be the most prevalent?
   f. From this picture, identify the organelle, provide its function, and state which type of microbe it is unique to
   g. What type of microbe is involved in the production of most breads? What type of microbe is responsible for polio?
   h. Based on the following graph, what will be the microbial population/ml after 3.5 hours of growth?
   i. Match the disease with the type of organism that causes it. (Div. C)

5. **SCORING:** Highest number of correct answers will determine the winner. Selected questions may be used as tiebreakers.