1. **DESCRIPTION:** Participants will solve problems and answer questions about agricultural sciences using their knowledge of ecology, animal and plant biology, and environmental chemistry.

**A TEAM OF UP TO:** 2

**APPROXIMATE TIME:** 50 minutes

2. **EVENT PARAMETERS:**
   a. Each team may bring one 8.5” x 11” sheet of paper that may contain information on both sides in any form and from any source.
   b. Each team may bring two stand-alone, non-programmable, non-graphing calculators.

3. **THE COMPETITION:**
   a. This event may be run as stations and may include observations, inferences, data analysis, and calculations. This event will be composed of four sections of approximately equal point value.
   b. Students will be tested on their knowledge of agricultural science. Year one of the rotation will focus on plants and year two of the rotation will focus on animals. This section will use multiple choice, matching, fill-in-the-blank and/or short answers in areas such as:
      i. YEAR 1 crop rotation, nitrogen and phosphate fertilization, pest and plant pathogen management, methods of measuring plant and soil health, measuring crop yield, non-responsive fields, plant-associated microbes, ecological function of soil invertebrates, nutrient cycling in soils, agricultural runoff, water usage, effect of tilling on soil chemistry, angiosperm development and reproduction, and classical plant breeding.
      ii. YEAR 2: herd management, hormone use in animals, pest and animal pathogen management, measuring animal yield (meat and milk production), animal development and reproduction, classical animal breeding, animal welfare.
   c. Prior to the tournament, teams must perform an agricultural experiment on one or more plants. Students will impound one notebook prior to the start of the tournament for grading. The notebook must contain at least three clear pictures of both team members working together with their plants. Notebooks which do not have these pictures included will not be graded.
   d. Students will be required to answer exam questions on site that demonstrate their understanding of their personal experiment.
   e. Students will be tested on their knowledge of experimental design. This section will use multiple choice, matching, fill-in-the-blank and/or short answers.

4. **SAMPLE QUESTIONS:**
   a. **PART A:** What nutrients are supplied by mycorrhizal fungi to their plant hosts? What nutrients are supplied by plants to mycorrhizae?
   b. **PART A:** The two specimens at this station were raised in fields with or without nitrogen fertilizer. Based on these specimens, is it likely that nitrogen fertilization improved crop yield? Why?
   c. **PART C:** Define experimental replicate and explain how many replicates were done in your experiment.
   d. **PART D:** Two sets of tomato plants are growing in a greenhouse. One set is given fertilizer. The height of the plants is measured after 1 week. What is the experimental variable?

5. **SCORING:**
   a. High score wins. Final Score = Exam score (part A, C, and D) + Notebook score (part B)
   b. If students do not impound a notebook the score for parts B and C will be zero. If students impound a notebook with an experiment that is not related to agriculture or the required pictures are missing the score for part B will be zero. All other sections will be scored as normal.
   c. Selected questions on the exam may be used as tiebreakers.
   d. Notebook score: Score will reflect the accuracy of the material provided, not whether or not the hypothesis was supported. See sample scoresheet.
      i. Hypothesis- 15% of score
      ii. Variables- 25% of score
      iii. Experimental Control- 10% of score
      iv. Methods and Materials- 10% of score
      v. Results- 15% of score
      vi. Conclusions- 25% of score
AGRICULTURAL SCIENCE NOTEBOOK
SAMPLE SCORESHEET
Total Score 50 points

1) Notebook documents an experiment related to agriculture
   Yes- continue to grade
   No- notebook score is zero

2) Three clear pictures of both team members working together with their plants
   Yes- continue to grade
   No- notebook score is zero

3) Hypothesis - 15% of score (7.5 points)
   Statement predicts a relationship or trend. 3pts 2pts 0pts
   Statement gives a specific direction. 3pts 2pts 0pts
   A rationale is given. 1.5 pts 1pts 0pts

4) Variables - 25% of score (12.5 points)
   Independent variable correctly identified 4pts 2pts 0pts
   Dependent variable correctly identified 4pts 2pts 0pts
   Controlled variables correctly identified 4.5pts 2pts 0pts

5) Experimental Control - 10% of score (5 points)
   Experimental control correctly identified 3pts 2pts 0pts
   Reason given for experimental control 2pts 1pts 0pts

6) Methods and Materials - 10% of score (5 points)
   Methods listed 3pts 2pts 0pts
   Materials listed separately from methods 2pts 1pts 0pts

7) Results - 15% of score (7.5 points)
   Qualitative observations are included 2pts 1pts 0pts
   Quantitative data is given in a table 2pts 1pts 0pts
   Quantitative data is given in a graph 2pts 1pts 0pts
   Relevant statistics are given 1.5pts 1pts 0pts

8) Conclusions - 25% of score (12.5 points)
   Hypothesis evaluated according to data 4pts 2pts 0pts
   Reasons to accept/reject given 4pts 2pts 0pts
   Statements supported by data 4.5pts 2pts 0pts