



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:**

- 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.
- Each team may bring two stand-alone, non-programmable, non-graphing calculators.

3. **THE COMPETITION:**

- 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.
- 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:
 - 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.
 - 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.
- 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.
- Students will be required to answer exam questions on site that demonstrate their understanding of their personal experiment.
- 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:**

- PART A: What nutrients are supplied by mycorrhizal fungi to their plant hosts? What nutrients are supplied by plants to mycorrhizae?
- 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?
- PART C: Define experimental replicate and explain how many replicates were done in your experiment.
- 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:**

- High score wins. Final Score = Exam score (part A, C, and D) + Notebook score (part 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.
- Selected questions on the exam may be used as tiebreakers.
- Notebook score: Score will reflect the accuracy of the material provided, not whether or not the hypothesis was supported. See sample scoresheet.
 - Hypothesis- 15% of score
 - Variables- 25% of score
 - Experimental Control- 10% of score
 - Methods and Materials- 10% of score
 - Results- 15% of score
 - Conclusions- 25% of score



**AGRICULTURAL SCIENCE NOTEBOOK
SAMPLE SCORESHEET
Total Score 50 points**

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|--|---------|------|------|
| 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 corrected 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 |