

# Guidelines for 2007 HSSO Event Supervisors

## Introduction

One of the biggest concerns and challenges to those working with a Science Olympiad event is how to ensure an appropriate level of consistency and quality at all levels of competition. The variety of fields, experience and expertise brought into these events by supervisors working at the state is variable. However, diversity in approach and subject matter is an important part of the process and a great deal would be lost if event development were to be overly regimented or centralized.

The following guidelines were developed to provide direction and assistance to persons charged with developing and running event for Hawai'i State Science Olympiad competitions at both the Division B and C levels.

## Difference between events at the Division B (Middle School) and C (High School) levels

The structure and basic material of the Division B and C events are similar but the level of questioning, math skills required and sophistication of answers differ. For example, the distinction between case-control and cohort studies is often a source of confusion for graduate students and it is a bit much to expect middle school students to fully understand the differences – especially at the regional or state levels. Division C competitors should be able to do this at any level of competition.

Within each Division, differences between the level of performance asked of competitors at the state and qualifying national levels are appropriate and should be fostered.

Table 1 gives examples of the types of performance indicators that could be expected from students at each Division. Ideally, an event would be a mix of each of these and it would not be inappropriate to find a Division C question in a Division B event at the state level

*Table 1: Examples of types of performance indicators that could be used in Division B and C events at various levels of competition.*

<b>Performance Indicators for Division B and C Events</b>
List, recognize and define terms associated with each event.
All materials used for building events conform with safety and material regulations outlined in the coaches/student manual.
Students should be able to perform all calculations based on given data or data that can be readily extracted for each event with or without calculator assistance depending on the event.
Student participants conform to safety regulations for each event.
Students are able to use technology effectively for events that require it. Technology may include calculators, computers, Internet and any robotic materials.

## Subject matter

It is appropriate to include background and other concepts related to events in competitions (especially at the Division C level) as long as competitors are informed well ahead of time and

provided with any links or other information that can be used to prepare. At both the Division B and C level, it may also be appropriate to provide competitors with explanations, definitions and formulas in the background information included in the event itself and ask competitors to assimilate and use that information to solve a problem. If this is done, it should not represent a major part of the event nor take an inordinate amount of time.

### **Developing an event**

Great events are developed by individuals and/or teams of individuals over a period of weeks. A mediocre or poor event would result from one person trying to develop it within a single evening. Although some expertise/experience is needed to develop a good event, it is not sufficient and input from persons experienced in developing questions and scoring rubrics is equally important.

A good event will reward and challenge students at their level of competition by including a mix of problems ranging from simple to difficult. This mix should reflect the division and level of competition with the local middle school competitions consisting primarily of relative simple problems testing knowledge of basic terms and principles and high school events consisting primarily of more complex problems involving the interpretation of information and use of principles to solve problems.

Ideally, an event should be based on a coherent and cogent collection of information about no more than three different problems or scenarios depending on the event. A good event will allow competitors to demonstrate their knowledge **and their ability to use that knowledge to solve problems**. It should result in a distribution of scores that will allow clear and unambiguous identification of a winning team (a difficult task in a highly competitive setting). A good event will not overly focus on findings by expecting students to interpret X-rays, data or results without providing background information such as normal ranges or keys. For Example, it would be unreasonable to expect competitors to recognize that a gram-negative diplococcus from a spinal tap most likely represented meningococcal meningitis unless background information such as a table of the staining reactions and morphologies of common causative agents for meningitis was included as part of the background information.

The first step to developing a good event is to select a number of engaging topics or scenarios that can serve as the basis for questioning. This is to ensure that, over time, a wide scope of problems addressed by the event topic is covered. However, this is an arbitrary decision on the part of those developing the event and need not be followed rigorously. There probably should be no more than two or three topics in a given event lest the event degenerate into a brief survey of the topic. Event topics should be as engaging as possible and reflect either events in the news over the past year or conditions that impact the age group reflected by the competitors. Looking to past events both at the state and national level is a great way to come up with new topics or develop past topics from new angles.

Once topics have been determined, the next step is to identify one or more usable articles dealing with the topic. The idea behind the event is to try to lead competitors through the same steps followed by investigators who actually worked on problems pertaining to the topic. This may require pooling information from different sources. Usable articles give sufficient background

information and enough detail that problems and methods can be clearly laid out. Articles that use tables that include non-significant as well as significant findings are useful – especially if they include sufficient information to allow calculations. Current editorial practice calls for brevity and makes these somewhat difficult to find. The availability of good articles is one of the major drivers behind which topics actually appear in an event. Generally 2-3 articles with a total of at least 1 or 2 good tables and 1 or 2 good graphs or figures are enough to develop a topic fully. These articles can be made available to competitors preparing for events via our website ([www.hssso.org](http://www.hssso.org)).

Once a topic and collection of articles have been identified the event can be developed. A typical event can be conceptually divided into three sections (Table 2). The first is background information. This generally leads up to the first set of questions. These often include topics such as definitions, and interpretations of graphs and charts. The next section can be thought of as the core and includes a description of actual studies and presentation of data or require students to perform a specific task. This may extend the findings of the first study, provide support for alternate hypotheses or address a different aspect of the problem. The last section may be thought of as the conclusion or summary. It may include questions relating to the task performed and or include methods to test experimental data against recorded data from materials in the introduction. This would generally be the place to evaluate **competitors'** understanding of the significance of results and their knowledge gained. It would also be a place to evaluate their ability to propose viable future studies activities.

*Table 2. Three major sections of a typical event.*

	Types of Things Presented	Questions that could be asked
Introduction	Background How was it recognized What is known about the problem Past trends	Definitions Importance of problem Interpretation of graphs Interpretation of charts
Core	Methodologies of 1 or more studies Data – tabular/graphic	Study design Calculate/interpret risk measures Identify factors that influence results
Summary	Analysis of results Comparison of theoretical and experimental results Description of things not studied or questions not addressed.	Next steps in evaluating the problem Extrapolations of findings Conclusions supported by the data.

Once the event has been developed and questions drafted, the next step is edit questions and develop a scoring rubric. Supervisors/Judges/Graders should submit a copy of their scoring rubric to the Hawai'i State Science Olympiad committee at least 30 days prior to the competition for review.

Editing questions involves making sure that they are appropriate in terms of what is expected of the competitors and appropriate to the level of the competitors. It may not be a bad idea to assign each question a difficulty score based on the depth of knowledge or skill required to give an acceptable answer and to ask the following questions about each.

- Is it testing fundamental knowledge and concepts or is it asking about esoterica?
- Is there the possibility of multiple interpretations and can it be made clear?
- Do competitors have the information they need to answer the question?

Questions should be specific in what they ask for. One simple way to address this is to switch from a question to a direction as in the below example. The preferred statements in the below examples have the advantage of telling competitors exactly what is expected.

#### Example 1

- Why do you think disease detectives chose this study design? (Avoid)
- Give three reasons why disease detectives chose this study design. (Prefer)

#### Example 2

- Consider again the data from the study. What kinds of misclassification may affect the ability of the data to substantiate your conclusions? (Avoid)
- Consider again the data from the study. The ability of these data to substantiate your conclusion may be affected by different kinds of misclassification of patients' exposures. List two examples of causes of such misclassification. (Prefer)

### **Administering an event**

Most events during the Science Olympiad tournament fall into one of two categories, "paper event" and "active event." Paper events are similar to a 50 minute essay exam whereas active events require competitors to actively participate or perform a task during the time allotted. The rules for most events allow for two team members to work together unless otherwise specified. Competitors must be aware of materials they are or are not permitted to bring to competition. These materials include safety equipment, calculators, pencils/pens and pre-constructed devices. Any location specific information relating to an event should be made available to the students at least 30 days prior to the competition.

The physical setup for the event should allow for team members to converse in low whispers without disturbing other teams. State events have been successfully given in both large lecture halls and laboratory settings. Teams have been staggered in lecture halls so that no team is directly above or below another and there is 1-2 empty chairs between each team. In laboratory settings, stools are clustered.

Event materials are distributed once teams are in place and teams are instructed not to open the materials until word is given. Once everyone has their materials, instructions are given and any questions answered about the conduct of the event. A timer is set and teams are instructed to begin. Although questions should be kept to a minimum, team members may ask questions concerning the scoring or mechanics of the process –e.g. where to put an answer or where to find a particular material. The amount of time remaining is periodically noted on the board. Late

arrivals should be quietly steered to a position and allowed to compete – they must stop with the remainder of the group. Some events, such as Storm the Castle, Scrambler and Tower Building break the 50 minute block into smaller blocks in which individual teams can perform a task relating to the pre-constructed device. Please consult the event details from the Coaches Manual for details.

Scoring is probably one of the most difficult parts of the process in that competitors frequently provide answers that were not anticipated during the development of the event, this can be countered by providing very well written questions. It is important that judges/graders be familiar with the event and scoring rubric well ahead of time. Extra effort and planning ahead of time will pay off at this stage. Ideally, judges/graders will all have played a role in developing the event and scoring rubric and had the opportunity to discuss the grading process beforehand. Although different persons may grade different parts of the event, each question should be graded by the same person in order to minimize the impact of inter-grader variability. In the past, this has been remedied by having the person(s) who set-up and supervisor of an event is the same who does the grading.

Any deviation from the rubric (e.g. points given for unexpected answers) should be documented on the answer key – significant deviations can be discussed with the judging/grading team. The total number of points earned should be written at the bottom of each page and on the front cover so that the total number of points can be easily determined. Depending on the difficulty of the event, 4-10 tiebreaker questions should be selected beforehand. These are used in sequence. For example, if team A and B tie on total, go to question 8, if they have the same score on question 8, go to question 25, if they have the same score on question 25, go to question 3 and so on until one team scores better than the other on a particular question in the sequence. It is a good idea to use the most difficult questions as tiebreakers early on. These should be factored into the regular score as well as being used to break ties. Once scoring has been completed, teams are ranked by their total with tiebreakers being used as described above to break ties within each rank.

In national competitions, the judges have made it a practice to review the top 10 exams as a group before assigning final scores in order to get common agreement on the results. While judges may change scores for questions they have graded, each judge has final word on the score he/she gave and it is inappropriate to suggest, let alone pressure a judge to change a score.

Following the state competition, the rubric used for grading will be made available online via [www.hssso.org/eventdescriptions](http://www.hssso.org/eventdescriptions) for teams that wish to challenge the scoring of a particular events.

### **Summary**

Developing and administering a good event requires a great deal of time and effort but can be a rewarding experience for event supervisors, judges and competitors if the above guidelines are followed. Some students will consistently rise to the occasion and give answers that would earn full credit in most graduate level courses while others will struggle with even the simplest of questions. That is to be expected but it is the responsibility of the event supervisor to ensure that all students have a fair and equal chance of being able to demonstrate their mastery of basic concepts and principles and to demonstrate their ability to use what they have learned to solve age-appropriate problems.

