Science Olympics: Helping Biology Compete

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The annual event known locally as the "Science Olympics" draws over 200 secondary school students to the University campus as competitors in various events that challenge their scientific knowledge and creativity in the areas of biology, chemistry, and physics.

A Science Olympics Manual providing background information, rules, and hints for all events is available to schools 2 months prior to the Olympics. Teams are assembled and begin training. Whenever more detailed instruction or coaching is required, one member of each team meets with the event coordinator in a "workshop." The Grade 9 and 10 events emphasize team work and participation; teams are large and the events tend to involve physical activity. Upper-level events focus more on individual knowledge and problem solving skills.

The Olympics format requires events that: (1) are derived from the secondary school curriculum, (2) can be prepared or practised in advance, and (3) can be completed reasonably rapidly on the day of competition. It has been my experience that developing biology-based events requires extra creativity in order to conform to this format. Examples from past and present biology events are listed below.

Amazing Rodents: Students construct a standard maze and train a mouse, hamster, or gerbil to run it in the minimum time. A training log must be kept to ensure compliance with the Guiding Principles of the Canadian Council on Animal Care.

"... and *this* Little Pig ...": Students are expected to develop careful dissection technique and become familiar with the name, location, and function of the major organs and physiological structures of the fetal pig. Competition involves location and/or identification of structures on partially dissected male and female specimens.

Fermi Event: Students develop their best estimates of quantities that are difficult or impossible to determine exactly. Teams must also provide an estimate of the likely uncertainty in their answers. Fermi questions often involve biological scenarios and/or biophysical problem solving. For example: What is the combined horsepower of all the honeybees from one hive? Project how large Canada's population would be in 250 years if present trends were to continue.

Stick 'em Up: Students are expected to become familiar with normal and abnormal human karyotypes. On the day of competition, teams must "cut and paste" and interpret a diagnostic karyotype from a poster-sized enlargement of a human metaphase cell.

If the Key Fits: Students are expected to become familiar with the use of dichotomous keys for the identification of organisms such as trees, wildflowers, insects, algae, etc. Another part of this event requires part of each team to construct a key that the remaining part of the team can then use.

Add 'em Up: Students are expected to develop proficiency with the use of the microscope, various micrometers, and cell counting chambers in order to estimate characteristics of cell populations such as cell type, concentration, volume, relative proportions of mixed populations, etc. Protozoans, yeast, and pollen have all been used in this event.