

# Science Olympiad Trials at C. J. Morris

## Sept 25<sup>th</sup> - Sept 29<sup>th</sup>

### ANATOMY

The event will test students' knowledge of human anatomy. The contestants will identify structures and organs of the human body. The contestants will also take a multiple choice test in which they will answer questions about the structure and function of the following organ systems:

- Skeletal
- Muscular
- Digestive
- Respiratory
- Circulatory
- Urinary
- Nervous
- Sensory
- Endocrine

### ASTRONOMY

The event will test student's knowledge of astronomy. The contestants will identify planets, the moon and its phases, the sun, a spiral galaxy, a nebula, a star cluster and a comet. The contestants will also take a multiple choice test to answer questions about important astronomical facts and concepts:

- Distinguish between the motions of rotation and revolution.
- State the effects produced by rotation and revolution of Earth.
- Demonstrate knowledge about units of time (day, month and year) and their astronomical basis.
- Arrange a group of bodies according to their relative sizes from largest to smallest.
- Arrange a group of objects according to their distance from either the sun or Earth.
- Demonstrate knowledge about the seasons on Earth and their causes.
- Be able to name and identify the phases of the moon and state the factors that produce them.
- Demonstrate knowledge about the members of the solar system.
- Demonstrate knowledge about solar and lunar eclipses and the conditions that produce them.

## PHYSICAL SCIENCE

The event will test student's knowledge of basic chemistry and physics. The contestants will take a multiple choice test to answer questions about important chemistry and physics concepts:

- Matter
- Physical properties
- Mass and weight
- Chemical reactions
- Components of an atom
- Elements and compounds
- Energy
- Light

## CAN RACE

A student will race a can against other students in a drag race format.

## THE COMPETITION

- Students will make can racers and bring them to the contest.
- The racers will be run on a course approximately three meters in length and thirty centimeters in width. The racing surface could be a gym floor, hallway, concrete or close nap carpet. Lane control will be provided by boards or other barriers along the outer edges of each lane.
- Any can (small or large size) may be used. Racer surfaces may not be modified by addition of any substance.
- Lollipop, Popsicle or other similar sticks may be used as the running arm. Tape and washers may be used.
- Racers will be released by contestants without any assisting push and must not be touched by anyone until they cross the finish line. Racers stuck against the lane barriers will have their "run length" measured at that point. Those jumping off of course will be ranked after those that stayed on the course.

## EGG DROP

The objective is to have a student construct and bring a package to protect an egg (from breaking) to be dropped free fall from a high spot selected by the tournament director.

- All loading of Large, supervisor-inspected Grade A eggs must be completed 30 minutes prior to the beginning of the event. Students are responsible for the egg during loading, dropping and unloading. The student must hand the egg to the supervisor once the drop is complete. Each package should be labelled with school name and number.
- The package size and weight limitation is no more than 20cm on a side and no more than 1 kg. Glass and metal may not be used. The package must be constructed by the participants and brought to the tournament. The package may not contain anything that would aid in the package adhering to the target.
- The package will be dropped free fall by one student from a height determined by the tournament director and announced when teams pre-register for the tournament. There will be only one drop with a time limit of three minutes to prepare for the drop from the time the judges say to begin. A plumb line may be used. Packages may be dropped through an aperture (provided by the supervisor).
- The drop area will be approximately 60cm x 60cm and made of solid material (e.g., ½" plywood) with a target in the center of the area.

## SCORING

Eggs that do not break or show cracks will be ranked first. Those that break or crack will be ranked after those that do not. The farthest distance of any part of the package to the center of the target will determine the score. The package with the shortest distance wins. Ties will be broken by the lighter package (without egg).

## PASTA MOBILE

To construct a vehicle entirely out of glue and pasta that, when released from the top of a ramp, will travel the greatest distance within a 1.5m wide “lane” before stopping.

### PROCEDURE

- Any supermarket variety of fresh (soft) or dry pasta uncooked and unaltered. Samples of the pasta used should be brought in the event of a challenge. Any commercially available glue is permissible. Only minimal use of glue is allowed, no “sculpting”, joint, or gap filling glue will be allowed. The pasta may be shaped by filing, sanding, or other dry machining techniques.
- The cart must be able to fit into a closed “shoe box” 30cm x 15cm x 10cm. There are no mass restrictions. The device must make and maintain contact with the surface on which it rests on at least three points. (Simple spheres, cylinders, etc. will not do.)

### THE COMPETITION

The racers will be placed on the ramp so that the rearmost part of the racer is in contact with a horizontal barrier at the top of the ramp. It is then released by the contestant (no helpful nudges allowed!). The ramp itself is a curved surface that is, at its highest point, 1m high. The entire ramp must fit in a space that is 1m high x 1m long x 0.5m wide.

### SCORING (BASED ON THE FOLLOWING CRITERIA)

- Presentation of a pastamobile that meets the specifications as outlined above.
- Its ability to complete the run essentially intact.
- The distance that the pastamobile is able to travel within the 1.5m lane out from the ramp. Should the pasta mobile lose its structural integrity (fall apart) during its run, the distance factor will be determined by the largest surviving structural component.
- The highest scores will be awarded to pastamobiles that remain basically intact and travel the greatest distance, followed by those that do not remain intact but do meet all other requirements. If the pastamobile rolls outside of the 1.5m wide lane; its distance will be measured along the edge of the lane to the first point where any part of the pastamobile crossed the boundary line.