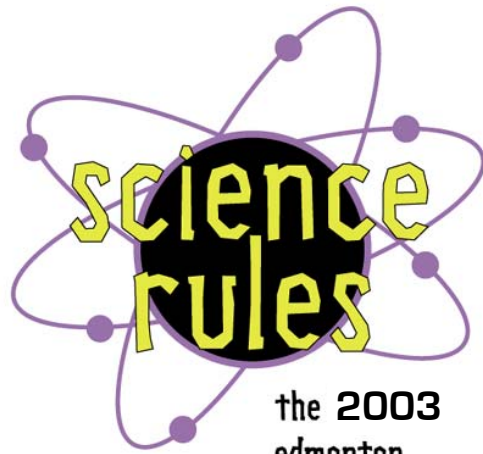


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# Science Olympics



the 2003  
edmonton  
science  
olympics. 

it's here.....  
and it rules.

## Event Package for Registered Teams

Saturday, March 1, 2003  
Shaw Conference Centre, Hall A  
Team sign-in begins at 8:30 a.m.  
Events begin promptly at 9:00 a.m.

Organized by teachers from:



EDMONTON PUBLIC SCHOOLS

Sponsored by:



**APEGGA**

The Association of  
Professional Engineers, Geologists  
and Geophysicists of Alberta

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## Using This Booklet

This booklet is intended for registered teams in the 2003 Edmonton Science Olympics. It outlines all of the take-home events for each division. The team is required to complete and bring the event(s) for their division only. Each event outlines what is required to complete the project and gives an idea of judging criteria.

## What Are The Science Olympics?

The Edmonton Science Olympics is an inter-school challenge where teams compete in problem-solving events that test the principles of science. There are two types of events:

- ♦ take-home events, which are made in advance and brought to the Olympics for on-site testing and judging, and
- ♦ Mystery Events, which are solved the day of the Olympics with no pre-planning.

Although winners of each event receive certificates of achievement or medals, our primary goal is to give students a chance to showcase their own ideas and see other students' ideas in action.

## Important Things To Keep In Mind...

1. If you think you've found a loophole in the rules or you've come up with a solution you think our judges may object to, phone us in advance to check it out. Please respect the intent of the rules as well as the rules themselves.
2. We know it's sometimes hard to keep teams' competitive urges under control. When students have worked so hard on their devices and projects. Please uphold the ideals of fair competition. One of the most important objectives of our science curriculum at any grade is to foster positive attitudes by appreciating the ideas of others.
3. While the event is underway, **ONLY** students should be at the site of that event. Coaches, parents and others need to give them room to compete without assistance.

## This Year's Events

**Division I and II** participate for half a day. They take part in two mystery events and one take home event.

Take home events:

**Division I:**

Crystal Garden

\* be sure to bring your projects to the event to be tested and judged

**Division II:**

A Weighty Matter

**Division III and IV** participate all day. They take part in three mystery events and two take home events.

Take Home events:

**Division III:**

Egg Launcher

KYOTO: It's getting hot in here...

\* be sure to bring your projects to the event to be tested and judged

**Division IV:**

Micro-Diorama

King Arthur's Dream

Teachers Mystery Event

**Note:** Mystery Events are hands-on challenges based on current science curricula. Students will be expected to problem-solve as a team to complete these activities on-site on the day of the Science Olympics.

## Everything You Need to Know

Following is detailed information on the problems you can work on in advance. You will need to bring the projects, etc. with you to the Shaw Conference Centre on the day of the competition. All of the other activities are mystery events, and you will only receive information about them at the actual time of the event. Bring with you your ability to think on your feet and in a group.

We do our best to keep the scoring fair. If you have any concerns about the judging of an event, refer them to the on-site referee. Your concerns will be reviewed and discussed, but the decision of the judges will be final.

## Details... Details... Details...

- ⇒ A team is 5 students plus 1 teacher/coach.
- ⇒ The concession operated by the Shaw Conference Centre provides hot dogs, sandwiches, and beverages, etc. However, students may wish to bring bagged lunches rather than purchase lunches.
- ⇒ Please arrive in time to set up and be ready for a briefing on the day's events at 9:00 a.m. You will receive a registration package upon your arrival - check at the desk located outside Hall A.
- ⇒ Elementary school teams will compete in three events and should be finished in a half day. Junior and senior high school teams will compete in five events and should be finished closer to 4:30 p.m.
- ⇒ Spectators are welcomed and encouraged! Bring someone along to watch! Bleachers will be set up - we do request that spectators remain in the bleacher area.

## The 2003 Science Olympics Wants You!

Does the Edmonton Science Olympics sound like fun? Then why not consider becoming an event volunteer?

If you are interested in serving as an event manager or judge you are required to attend a meeting on Saturday, February 22<sup>nd</sup> from 11 am - 2 pm, which will familiarize you with the rules and judging requirements for the events, followed by attendance at the actual events on Saturday, March 1.

If you've got the drive to help us pull this exciting event together, we would love to hear from you!

Call Lindsay Malden at (780) 426-3990, ext. 364 or e-mail [lmalden@apegga.org](mailto:lmalden@apegga.org)

## Questions? Need More Information? Contact:

**Barry Edgar**  
**Strathcona Composite High School**  
**Telephone: (780) 439-3957**

**Tara Richardson**  
**APEGGA**  
**Telephone: (780) 426-3990**

### **The Challenge:**

In this event, each team will be in charge of growing the biggest and most beautiful crystals possible. Along with the crystals, each team will need to present a journal of their crystal's life in a creative manner.

### **Materials:**

Materials found in a grocery store.

### **Directions:**

Using materials found in a grocery store, you must grow a colorful crystal. Along with the crystal you must also submit a detailed journal of your crystal's life, including how long it took to grow, the materials used, and why you chose the specific color for your crystal.

### **Rules:**

- ◆ All crystals must be grown in a clear container no larger than 1 litre
- ◆ All materials used in the growing of the crystal must be found in a grocery store (purchasable in everyday life).

### **Judging:**

Each team's entry will be awarded either a Bronze, Silver or Gold based on their project.

Points are based on:

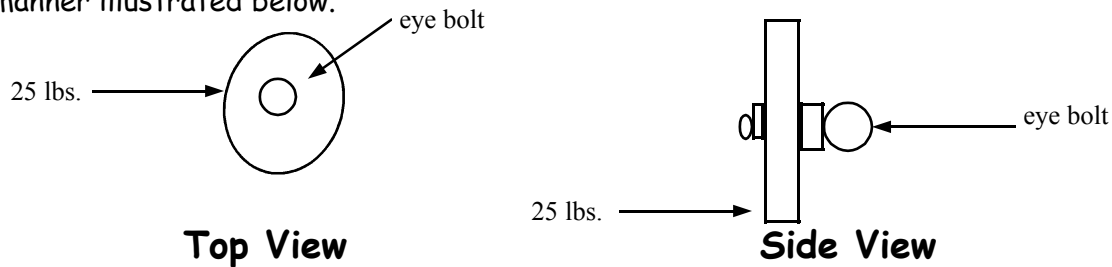
- ◆ Size of crystal
- ◆ Color of crystal
- ◆ Crystal journal
- ◆ Creativity
- ◆ Information
- ◆ Description

# A Weighty Matter

Division II (Grades 4-6)

## Objective:

To construct a device capable of lifting a twenty-five pound weight arranged in the manner illustrated below.



## Rules:

1. Pre-manufactured devices specifically designed for lifting (e.g. car jacks, block-and-tackle arrangements etc.) may not be employed. Student-made facsimiles of the foregoing are permissible.
2. Participants will have one minute to engage lifting devices with the weight and complete a lift.
3. The magnitude of a lift will be determined by measuring the distance between the lowest point of the weight assembly and the elevation at which the lift began. Competitors may choose to design a device which elevates the weight above floor level prior to the commencement of the lift, but only net distance obtained during the lift will be considered.
4. Only teams achieving successful lifts will be eligible for scoring points. Other criteria outlined below will also be used in determining a winner.

## Judging Criteria will include:

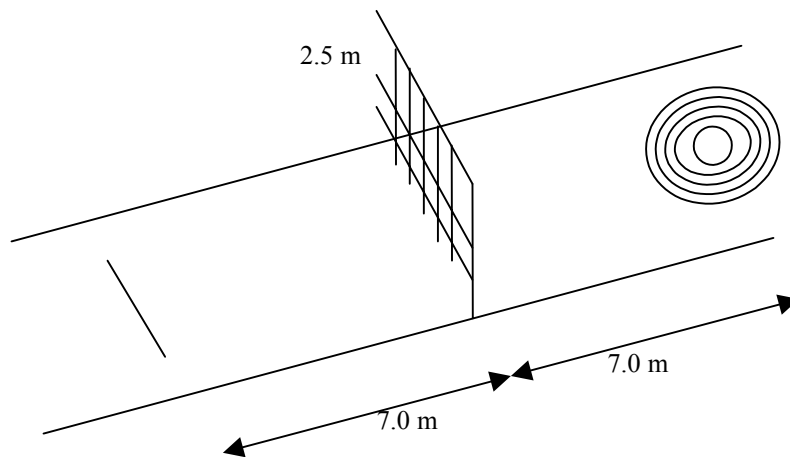
- ◆ The greatest net increase in elevation attained during a lift.
- ◆ The aggregate weight of all elements of a lifting device. The lighter the total weight of all components combined, the greater the number of points will be awarded.
- ◆ The simplicity of a lifting device. The fewer moving parts, the greater the number of points to be awarded.
- ◆ The amount of force required to achieve upward movement of weight. The less force required the greater the number of points to be awarded.
- ◆ Novel use of material. Bonus points will be awarded to any team(s) using components in their lifting device that are not normally used for the purpose of lifting.

# Egg Launcher

Division III (Grades 7-9)

## Overview:

To design and construct a device to launch an object over a net and hit a target, with minimal damage to the object. The net is 2.5 m high. The target will be 14 m from the launch site. The object will be an uncooked medium size (chicken!) egg.



## Materials :

Anything except pyrotechnical devices, sources of flammable ignition or anything that may be dangerous, as determined by the judges.

## Rules:

1. Launch mechanism must fit inside a 50 cm by 30 cm rectangle (taped on the floor) and must be no higher than 1 m at any point of its operation.
2. Egg protector must weigh no more than 200 grams.
3. Teams will have 5 minutes to set up and launch 2 eggs.
4. Trigger device cannot contribute to launch power.
5. The launching device may not be taped or held to the floor in any way.
6. Distance will be measured from final point of rest.
7. Judges must be able to take the egg protector apart after impact to check egg condition.
8. Launcher must be handed in to judges table before 8:45 am on the day of Science Olympics.

## Judging Criteria:

Scoring is based on accuracy to target and condition of the egg.

## KYOTO: It's getting hot in here...Division III (Grades 7-9)

### Overview:



In December of 2002, Canada's environment minister formally notified the UN of the ratification of the Kyoto protocol, a day after Prime Minister Jean Chrétien signed the 1997 treaty limiting greenhouse gas emissions at a ceremony in Ottawa. The Kyoto accord requires industrialized countries to cut their emissions of carbon-containing pollution, which most scientists believe are causing a gradual rise in global temperatures.

Environmentalists have praised the Canadian decision as a display of world leadership in the fight against global warming.

"In the face of opposition from a strong fossil fuel lobby, he (Chrétien) moved forward with the long-term interests of Canada and the globe in mind," said Jennifer Morgan, director of the World Wildlife Fund's Climate Change Program.

Premier Ralph Klein raised the international accord on reducing air pollution with Nova Scotia Premier John Hamm. Both premiers have been critical of the Kyoto accord, saying it will penalize energy-producing provinces if ratified by Ottawa. Klein strongly opposes Kyoto, which he argues will cost Alberta's energy industry thousands of jobs and the Canadian economy billions of dollars.

Federal government reports disputes claims that Alberta will be hit especially hard by the Kyoto pact. The study assumes there will be no increase in taxes, and that the energy industry will benefit from investments in alternative fuels.

Critics of Kyoto, including a vocal business lobby, have complained that Ottawa does not know the true cost of implementing the accord.

### Task:

Four major groups that will meet together to debate over the Kyoto Accord. They are the Alberta Energy Companies, Environmental Groups, the Alberta Provincial Government (as part of Ralph Klein's party), and the Federal Government (as part of the Federal Environment Minister David Anderson's support group) respectively.

Your group will represent: (highlighted option)

Alberta Energy Companies

Environmental Groups

The Alberta Provincial Government The Federal Government





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Your group will be responsible for the following tasks:

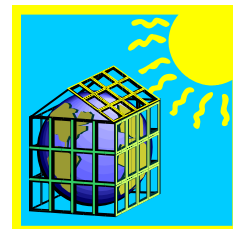
- ✓ A PowerPoint Presentation of **ONLY 7 SLIDES** which includes:
    - A title page with an appropriate title for your group
    - The members of your group
    - The name of your school
  - ✓ Your presentation will support or oppose the establishment of the Kyoto Accord.
  - ✓ Music and pictures are allowed; however, no video clips are permitted.
  - ✓ Be creative and accurate with your information.
  - ✓ 1 person should be available to answer any questions from the judges on the day of the event [SEE BELOW FOR FORMAT]
  - ✓ use a version of PowerPoint no newer than **Windows 98**
- \* Your presentation should fit on a 3 ½ inch floppy disk.



**Please note: You must be willing to sign a waiver giving permission to APEGGA to publish your presentation on their web site or in their newspaper.**

You are required to submit a hardcopy of the presentation and the disk with the presentation by courier **NO LATER THAN** 3:30 pm on February 25<sup>th</sup>, 2003 to:

**Attention: Calvin Yong  
Grandview Heights School  
6225 - 127th Street NW  
Edmonton, AB T6H 3W8**



# KYOTO: It's getting hot in here...

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## Initial Round:

- ❖ At the time of the event, there will be on-site judges that will examine all of the presentations for your specific group that is represented (i.e. all the Alberta Energy Company PowerPoint presentations will face-off, all the Environmental groups will face-off, etc.)
- ❖ Out of the four possible groups, only the top two presentations from each group will be selected to compete in the FINAL ROUND.

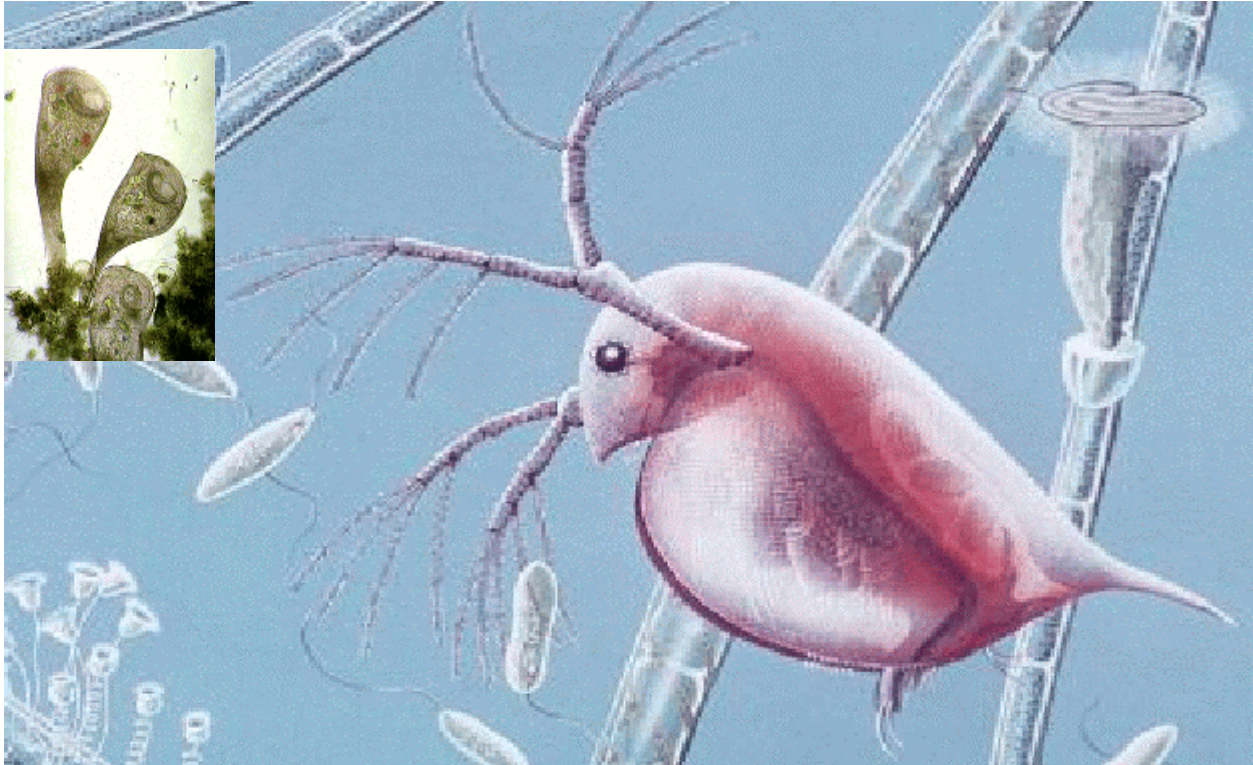
## Final Round:

- ❖ In the final round, each group will have no more than 5 minutes to present their case to a celebrity panel of judges. During this time, the groups are allowed to use/bring signs, posters, etc. to plead their case.

## Judging Criteria:

Creativity and Aesthetic Appeal	30%
Accuracy of Facts Presented	35%
Validity of Arguments	25%
Proper Documentation	10%





### Overview:

Contestants **create a micro-diorama** using readily available materials and their imaginations. The physical size of the diorama shall be no larger than 70 cm x 45 cm x 45 cm and the scene shall have a minimum scale of 70X. The entire scene will therefore have maximum scale dimensions of 1.0 cm x 0.6 cm x 0.6 cm.

### Judging:

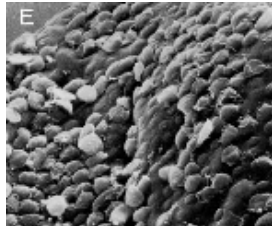
Judging is based on **accuracy of scale** and **life-like representation** of the scene. Each entry must have **accompanying documentation** that shall include:

- (a) an **accurate scale photograph of the main organism or object**
- (b) **information about the real life situation represented by the diorama**
- (c) **notations of scale of each of the major elements of the diorama (e.g. the ciliates (*Paramecium sp.*) in the upper left corner are 140  $\mu\text{m}$  long, the flagellates (*Perenema sp.*) are 180  $\mu\text{m}$  long, etc. etc.)**



## Micro-diorama

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*Giardia lamblia* on intestinal villus



*Cladonia sp.* a lichen

The scenes may be taken from physiology, botany, pond water scene, ecto-commensals on pond snails, medical micro-scenes or just about any other other micro-scene the contestants want to present. Soil scenarios or leaf litter jungles or the flora and fauna of the human skin might be interesting. One interesting scene might be the surface of a leaf infested with aphids or an insect parasitized with a fungus or the view from inside a blood vessel or the chamber of clanging bones in the middle ear. The possibilities are nearly endless.

Restrictions: subject must be organic... no silicon wafers or microchips please. What do the gills of fish look like to the glochidium (clam larva) that attaches to the gill filament? *Demodex follicularum*, the follicle mite, is perhaps a good subject.

### Judging Criteria:

Esthetic Appeal	50%
Accuracy of the biology of the Scene	20%
Accuracy of Scale	20%
Documentation	10%

# King Arthur's Dream

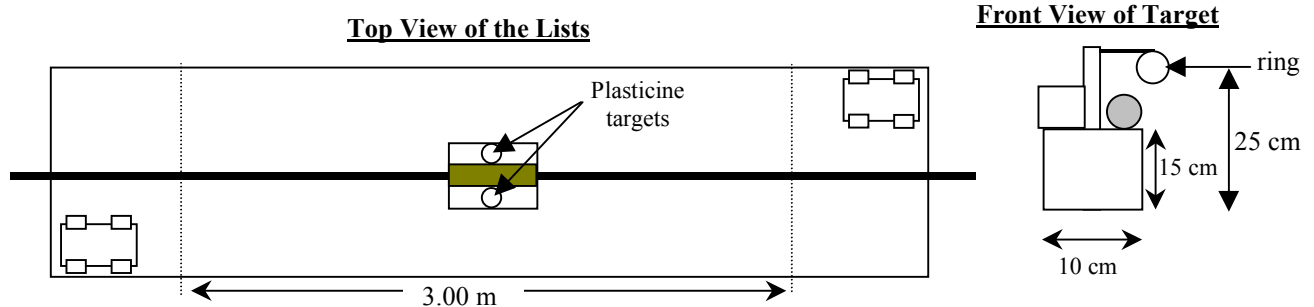
Division IV (Grades 10-12)

## Purpose:

To design and build a mechanical "knight" within the rules set out below, that can survive the test of combat in a jousting tournament.

## Rules:

1. The steed for your "knight" must be a wheeled vehicle powered by a small electric motor (supplied) connected to two AA standard batteries. The weapon of choice for your knight must be medieval in nature and powered only by a standard Victor® mousetrap (NOT a rat trap).
2. Your goal is two-fold. Firstly, to strike a target, a 50-gram mass of plasticine shaped into a sphere (about the size of a golf ball), located on a platform 15 cm above the ground. Secondly, to remove a ring mounted 25 cm above the ground with a lance.
3. At the competition you will begin 3.00 m from your opponent on the other side of a wooden divider (1"x 2") as shown in the sketch below. This is referred to as "the lists".



4. On a "go" command you will start your steed. Your mousetrap may be triggered by the pull of a string when you deem it to be the right time.

5. Any part of your vehicle that extends into the opponents side of the lists may only move via the energy stored in a mousetrap - all other forms of energy are illegal.

- i.e.
- You may have a lance fixed to your vehicle but that lance cannot move relative to your steed unless your mousetrap is the motive force .
  - You may move a weapon into the other side of the lists but the mousetrap is the only source of force to do so - gravity assists are not allowed! (Tipping over a standing hammer involves a gravity assist.)
-

# King Arthur's Dream

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6. The knights will compete as many times as possible in two minutes. The winner will be the knight that inflicts the most damage (hits plus rings). In the event that there is no clear winner after the allotted time, the judges will decide who advances, using their discretion.
7. The judges will tell you when you may pick up your vehicle for another run at the target.
8. You may change weapons between matches, but whatever weapons you choose for a particular match may not change.
9. You may choose to attack your opponent's knight. No points will be awarded for this but in the case that a steed is unable to carry its knight into combat, the match ends and the score at that time will stand.
10. As in days of old, the knight that can't make it to the lists at the time of competition loses by default to the other knight. After a few minutes of healing, setting bones, drinking magic elixirs, etc. your knight must be ready to compete when called again.

## Judging Criteria:

Points are awarded according to the number of times you damage your target, or remove the ring from its mount.

Damage is assessed by the "Master of the lists" and his/her apprentices. Their decisions are irrevocable!

## Safety Issues:

- \* NO fire of any kind!
- \* NO throwing of anything!
- \* In case you are wondering if your weapon is "legal", contact us for an advance ruling. Any weapon that is deemed unsafe by the judges at the time of competition shall be disqualified!

Participants are invited to bedeck their steed in its finest armour. Although this is optional, the judges might break a deadlock on the basis of a steed's finery!