



APEGGA

*The Association of
Professional Engineers, Geologists
and Geophysicists of Alberta*

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NATIONAL ENGINEERING & GEOSCIENCE WEEK
FEBRUARY 25 - MARCH 6, 2005

PROVINCIAL SCHOOL CHALLENGE

GRADES 1-12



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NATIONAL ENGINEERING & GEOSCIENCE WEEK PROUD PAST: CONFIDENT FUTURE

National Engineering & Geoscience Week (NEGW) is an annual event designed to increase public awareness about the important roles that engineers, geologists and geophysicists play in the everyday lives of Canadians. In Alberta, this event is sponsored by The Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA) and is celebrated from February 25 to March 6, 2005.

Engineers, geologists and geophysicists use math and science, as well as creative ideas, teamwork and technology to solve problems and make our lives safer, easier and more comfortable.

APEGGA is organizing activities around the province during NEGW. In addition to the Provincial School Challenge, APEGGA sponsors Science Olympics in various locations across the province, classroom visits, mall science exhibits and other regional events. APEGGA will also publish a newspaper supplement in the *Edmonton Journal* and the *Calgary Herald* on February 24, 2005. For more information, visit www.apegga.org/NEGW

APEGGA is responsible for regulating the practice of the professions of engineering, geology and geophysics in Alberta. With more than 40,000 members, APEGGA is the largest professional association in Alberta.

PROVINCIAL CHALLENGE BACKGROUND INFORMATION

Students from schools across Alberta are invited to compete in a challenge for Grades 1 - 6 or Grades 7 - 12. The challenges test imagination, creativity, design and team skills. The concepts involved in the challenges are based on the principles of physics, combined with structural, mechanical or materials engineering principles.

Physics – concepts of mass, density, distribution of mass, centre of gravity, forces, statics, momentum and torque

Structural engineering – concepts of stability, balance, structural design, tension and compression

Mechanical engineering - design of a mechanical device

Materials engineering – properties of materials and combining materials

There may be other areas of science, engineering, technology and mathematics that can be drawn into the activity. Teachers should tailor content appropriately for the age and grade level of the students.

Entry Rules

1. The Mousetrap Car Challenge is open to Alberta students in Grades 7 through 12.
2. Teams should be no more than four students. All students in a team should be in the same grade. While it is intended and preferred that the challenge be completed by teams, single student entries will also be accepted.
3. Entries must be received by APEGGA **before 5:00 p.m. on Friday, March 11, 2005**. Your entry must include:
 - linear distance traveled by the vehicle (recorded in millimeters)
 - names of the team members and grade level
 - school name, address, telephone number and a teacher contact
 - photo of the winning car and building team members

Mail, fax or e-mail your entry to:

Provincial School Challenge

c/o APEGGA

2200 Scotia Centre, 700 2 Street SW

Calgary AB T2P 2W1

Fax: (403) 269-2787

E-mail: hfrantz@apegga.org

4. All judges' decisions shall be final.

Questions or Concerns

Call Heather Frantz at (403) 262-7714

APEGGA Judges

APEGGA members would like to assist with your judging, where possible. Volunteer judges will be made available on a first-come, first-served basis. Unfortunately, APEGGA cannot guarantee availability of volunteers in all areas.

To request an APEGGA judge, please e-mail Heather at hfrantz@apegga.org and include the place, date and time of judging.

GRADES 7 - 12 MOUSETRAP CAR CHALLENGE

The Challenge

Build a vehicle powered solely by the energy of one standard-sized mousetrap that will travel the greatest linear distance.

Materials

- The device must be powered by a single mousetrap, size 1 3/4" X 3 7/8". Any brand may be used.
- The judges have the final decision on the appropriateness of any additional items that might be used in the construction of the racer.
- Ruler/ measuring tape
- Masking tape

Rules for Construction

- By definition, a vehicle is a device with wheels or runners used to carry something (e.g., car, bus, bicycle or sled). Therefore, launching anything from the mousetrap will be ruled illegal.
- The mousetrap cannot be physically altered except for the following: four holes can be drilled only to mount the mousetrap to the frame and a mousetrap's spring can be removed only to adjust the length of its lever arm.
- The device cannot have any additional potential or kinetic energy at the start other than what can be stored in the mousetrap's spring itself. This also means that you cannot push start your vehicle.
- The spring from the mousetrap cannot be altered or heat treated.
- The spring cannot be wound more than its normal travel distance or 180 degrees.
- Vehicles must be self-starting. Vehicles may not receive a push in the forward direction or side direction.

Judging

- The race track can be any smooth level floor, a gymnasium or a non-carpeted hallway.
- Each contestant will be given three attempts. The winner will be the racer that has obtained the greatest distance on any one of the three attempts. Any ties will be decided by a single run off between the racers that tied.
- Distance will be measured from the front of the tape at the starting line to the point of the vehicle that was closest to the start line at the time of release.
- Record the distance in **millimetres**.
- The vehicle must steer itself. Measurements of distance will not measure the total distance traveled, only the linear distance.

PRIZES

All prizes are donated by APEGGA.

Prize money will be awarded to the winning school, not directly to the students. APEGGA asks schools to apply the prize money towards the purchase of school materials and/or field trips for students.

	Grades 1-3	Grades 4-6	Grades 7-9	Grades 10-12
First	\$300	\$300	\$300	\$300
Second	\$200	\$200	\$200	\$200
Third	\$100	\$100	\$100	\$100

Provincial winners will be announced March 31, 2005 and will be notified by phone. Overall results for all competing teams will also be posted on the APEGGA science website after all the winners have been contacted.

IMPORTANT INFORMATION

1. All activities must be done at your school.
2. Schools should only forward results of the winning team for each grade.
3. All entries must include a photograph of the team and their project in order to qualify. Include photos and documentation for your school's participation and forward them (preferably via e-mail) to APEGGA. APEGGA is collecting this information for use in promoting this event and may make it public by means of oral, printed or electronic publication.
4. Every effort has been made to ensure that the activities are fair and that the project specifications are clear. We ask that you respect the rules, as well as the friendly nature of the competition. If you have any questions or require clarification, please call us prior to undertaking the activity. Failure to do so could result in ineligibility if your design does not meet the challenge specifications.
5. **All judges' decisions shall be final.**

GRADES 1 - 6 PAPER CHAIR CHALLENGE

The Challenge

Make the strongest and lightest chair possible using newspapers.

Materials

- Broadsheet newspaper (63 cm x 60 cm) - The *Edmonton Journal*, *Calgary Herald*, *National Post* and *Globe and Mail* are examples of broadcast newspapers. Do not use tabloid style newspapers like the *Edmonton* or *Calgary Sun*. Collect newspapers early. Try recycling depots or ask students to save newspapers from home. Local print media may be willing to donate extra newspapers.
- Weights - use anything stackable. Paper chairs may hold more than you think. All weights used must be weighed and recorded. Suggestions: bricks or concrete blocks, heavy books, large containers or pop and milk bottles filled with water.
- Bathroom scale or equivalent
- Ruler/ measuring tape
- Masking tape - 1 roll (18 mm x 55 m)
- Optional - plywood boards (approximately 45 cm x 45 cm x 12 mm thick). These can be placed on the seat to help hold and stack weight. If boards are used, record their weight.

Rules for Construction

- A maximum of 30 full sheets of newspaper may be used. Discard half sheets (31.5 cm x 30 cm).
- The seat of the chair must be a minimum of 25 cm off the ground.
- The chair must be free standing, i.e. not leaning against a wall, table, etc.

Judging

- Take a picture of the chair and team members before the chair is tested.
- Record the weight of the chair.
- Add weight on the seat in small increments. If desired, place plywood on the seat to help stack weight. Do not overload.
- Add weights (and plywood) until the chair reaches its limit.
- Record the weight that the chair held prior to its destruction (to two decimal places).
- The chair may be strong enough to seat a classmate or teacher. If so, it must bear the full weight of the person (feet off the floor).
- In the case of a tie, the lightest chair will be the winner.

Entry Rules

1. The Paper Chair Challenge is open to Alberta students in Grades 1 through 6.
2. Teams should be no more than four students. All students in a team should be in the same grade. While it is intended and preferred that the challenge be completed by teams, single student entries will also be accepted.
3. Entries must be received by APEGGA **before 5:00 p.m. on Friday, March 11, 2005**. Your entry must include:
 - total mass supported by the winning chair
 - weight of the chair prior to testing
 - names of the team members and grade level
 - school name, address, telephone number and a teacher contact
 - photo of the winning chair (prior to testing) and the building team members

Mail, fax or e-mail your entry to:

Provincial School Challenge

c/o APEGGA

1500 Scotia One, 10060 Jasper Avenue NW

Edmonton, AB T5J 4A2

Fax: (780) 425-1722

E-mail: lmalden@apegga.org

4. All judges' decisions shall be final.

Questions or Concerns

Call Lindsay Malden at (780) 426-3990, ext 2365, or Toll Free at 1-800-661-7020

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