EVENT: SPECTRUM CHALLENGE	**LEVEL:** SECONDARY – GRADE 7 - 8
START TIME: 10:00 AM MARCH 26, 2004	**LOCATION:** CARLTON HIGH SCHOOL RM. B113
INTERNATIONAL TRADE #: N/A	**DURATION:** 2 HRS.

PURPOSE OF THE CHALLENGE:

As part of the Skills Canada Saskatchewan Provincial Skills Competitions, schools are invited to "showcase" the talents of grades 7 and 8 students in the Grade 7-8 SPECTRUM Engineering Challenge on Friday, March 26, 2004 at Carlton Comprehensive High School.

Students will have an opportunity to compete in a friendly environment to demonstrate their creative, collaborative and problem-solving skills in solving an open-ended challenge.

SKILLS AND KNOWLEDGE TO BE TESTED:

Teams of four(4) will be assessed on their ability to:

- neatly assemble a successful solution to the challenge within the time constraints,
- demonstrate mathematical, scientific and technological knowledge as appropriate to the grade 7 and 8 curriculum expectations,
- exhibit sound design principles, demonstrate an efficient use of materials,
- demonstrate best practices in using tools and materials,
- model a collaborative distribution of tasks,
- follow safe working practices, and,
- organize and present an informative solution to the challenge.

THE BRIDGE PROJECT

The bridge must be sketched on graph paper at the competition before beginning.

SPECIFICATIONS

144 inches (366 cm) of 1/4 in. (6 mm) by 1/4 in. (6 mm) square pine doweling, 0.5 cm x 0.5 cm x 120 cm square balsa and craft sticks will be provided for each group. The bridge must span 32 inches (81.3 cm) and be 3 1/4 inches (8.26 cm) wide. **It can be any height.** Please note a weight will be suspended from the underside of the bridge at the end of the competition and the bridge will hold a minimum of 11 lbs (5Kg).

*** Please Note * Materials supplied may change at competition time to ensure equity among competitors.**

EXPECTATIONS:

Within each of the Strands listed below, the Engineering Challenge will allow students to display their knowledge of the following overall expectations:

Structures and Mechanisms:

- demonstrate an understanding of the effect of forces acting on different structures and mechanisms;

• design and make load-bearing structures and different mechanisms, and investigate the forces acting on them;
• evaluate the design of systems that include structures and mechanisms, and identify modifications to improve their effectiveness.

SUGGESTED MATERIALS & EQUIPMENT

Students should be familiar with the use of the following resources. This is a representative list. Other materials may be available for use at the Skills Canada Saskatchewan Grade 4-6 Technology Challenge:

- Hand Tools: saws, mitre-box/bench hook, glue guns, scissors, rulers, pencils.
- Materials: card-stock, tape, twine, elastic bands, fasteners (paper-clips, tacks, etc.), 10mm square wood, 3/16" dowelling, carpenter's glue, wheels, popsicle sticks, and sandpaper.

- Students should also be familiar with levers, ramps (inclined plane), conveyors (horizontal movement systems), lifts (vertical movement systems), hinging systems, Jinx framing (wooden strips secured with card-stock gussets).

All tools and materials will be provided. **No other equipment will be allowed in the competition area.**

EVALUATION CRITERIA

Throughout the evaluation process, judges will be assessing the following components:

1. PROCESS:
- an understanding of the challenge
- initial planning
- equitable assignment of tasks
- co-operation with team members
- enthusiasm and motivation

2. PRODUCT:
- appropriate use of tools and materials
- efficient selection and use of materials
- sound design principles
- safe working practices
- maintaining a safe/tidy workstation
- neatness of the product (aesthetics)
- product completion within the time allotted
- function of the parts

3. DESIGN BRIEF (to be distributed to judges by each team)

- statement of the problem (explanation of the situtation)
- outline of ideas (sketches and written)

- work plan - written record of the stages they went through while developing the solution and problems encountered during development
- evaluation – what worked and didn't work, testing and improvements

4. ORAL PRESENTATION / PROMOTION / DEMONSTRATION: (10 minutes maximum for each team)
This will be a shared and informative presentation of the process used and the solution to the challenge. Students are expected to:

- Talk about their design brief.
- Promote the solution to the challenge to an evaluation panel.
- Demonstrate the functionality of their solution.

Students will also be evaluated on:

- detail/content within the presentation .
- clarity of the presentation.

- poise and eye contact with the audience.
- references to the solution as an aid.
- time allotment.

GUIDELINES

The following guidelines are to assist teachers and their students in any pre-preparation for the Grade 7-8 Engineering Challenge. The guidelines are designed to introduce the kinds of procedures, resources, challenges, and assessment strategies that students would be expected to encounter in developing their solutions at the Saskatchewan Challenge.

PROCEDURES:

1. All teams should begin and end the challenge at the same time.

2. The event should include an orientation to establish ground rules, discuss the evaluation criteria, and to make sure there is a common understanding of these by all participants.

3. Teams should be instructed to collaboratively plan and assign tasks to each member before beginning the challenge.

4. The use of capable third-parties are encouraged to judge team solutions and presentations. If teacher advisors are used for judging, they should model the expectations of a judge by giving aid in clarifying instructions only. Evaluating team efforts must be continuous and include both the assessment of the process and product of each teams achievements.

5. Students should be encouraged to allot time to prepare a written design brief of their solution to the challenge. The brief should include:

- Statement of the problem (students explanation of the solution)
- Outline of Ideas (drawings and written)
- Rational for choice (construction procedure and problems in development – work plan, drawings etc.)
- Evaluation – what worked / what didn't work, improvements and testing

6. Time should be allotted for each team to make an oral presentation of their solution to the challenge. Team members should share a part in this presentation.

STUDENT PREPARATIONS:

With each challenge, students should be made aware that they will be assessed on their ability to demonstrate good design principles. This suggests the use of one of several available problem-solving models. To outline the process of developing solutions to the challenge and student expectations within each challenge, the following components should be considered:

A PROBLEM-SOLVING MODEL

SITUATION OR NEED: Each challenge should be introduced with a short paragraph that sets the stage for the challenge to follow. A "situation" gives each student some background information that will assist them with the development of their solution.

PROBLEM: Statement of the problem. Design and make . . .

INVESTIGATING (BRAINSTORMING): This is the beginning point for student investigations. Factors for them to consider include:

- careful consideration of the directions stated by the challenge and in the context of the "need" or situation that had been described,
- the materials that are available and which ones might assist with the challenge. Are there advantages that a selection of one material would have over another? Are there limitations to material choices?,
- the structures, mechanisms, or devices that will assist with a possible solution. Are there advantages or limitations with the available options?,
- sketches of possible solutions,
- the efficient use of materials. Has the choice of structures and the inclusion of mechanisms and devices allowed for a solution with a minimum of waste?
- considerations of safety, function, appropriateness of size, end use, durability, quality and appearance,
- a consensus among team members on the best possible solution.

CREATING: Once students have investigated all possible solutions, they now begin looking at creating their solution. Factors to consider at this stage include:

- dividing the components of the chosen solution into specific tasks,
- selecting a team leader and allocation of tasks to team members,
- selecting the tools and devices and calculating the amount of materials required,
- looking for simplification of assembly procedures,
- consider modifications and to alter sketches as required,
- consideration of time and its allocation to the completion of component parts,
- following safe procedures,
- maintaining a neat and safe workstation,
- assemble solution to the challenge

EVALUATING: Students must be directed to evaluate the success of their chosen solution at each stage of its development and as a final product. Questions they should ask themselves include:

- is each component part going together the way it was intended? Can it be modified in any way to work better?
- is each component part going to fit with the other parts?
- does the final product do what was intended? Can it be modified within the time constraints to work better? If this challenge was done again, could it be improved?

- is the final solution neat and ready to be demonstrated?
- have the presentation materials been completed and each member ready to describe their role to the judges?

JUDGING CRITERIA BREAKDOWN:

Process –	15%
Product –	50%
Design Brief –	15%
Oral Presentation –	20%

2004 Grade 7 & 8
Spectrum Challenge Registration

A registration fee of $5.00 per competitor includes lunch on competitor day and Registration Package.

Following are the Rules and Conditions and Registration Forms. Please send the completed forms along with the registration fee of $ 5.00 per competitor by March 17, 2004 to:

Saskatchewan Labour Force Development Board
202 – 2222, 13th Avenue
Regina, SK. S4P 3M7
Telephone: (306) 352-0260
Fax: (306) 757-7880
E-Mail: skills@slfdb.com

***Each of the Four (4) Team Members Must Fill Out Their Own Registration Form**

Note: Competition spots are reserved on first come, first serve basis. A registration fee of $5.00 per competitor must be submitted at that time. Please make cheques payable to Saskatchewan Labour Force Development Board and forward to the Saskatchewan Labour Force Development Board.

Competitor Rules and Conditions

As a competitor/participant in the 2004 Skills Canada Saskatchewan Provincial Skills Competition, I have read and understand the "Registration/Release Form". By signing it I agree to the following terms:

Liability and Medical Release

I hereby agree to release Saskatchewan Labour Force Development Board and its project, Skills Canada Saskatchewan, its representatives, agents, servants and employees from liability for any injury to the named person, resulting from any cause whatsoever occurring to the named person at any time while attending any Skills Canada Saskatchewan activities, including travel to and from these activities, expecting only such injury or damage resulting from willful acts of such representatives, agents, servants and employees.

I do voluntarily authorize Skills Canada Saskatchewan to obtain routine or emergency diagnostic procedures and/or routine or emergency medical treatment for the named person as deemed necessary in medical judgment.

I agree to indemnify and hold harmless Skills Canada Saskatchewan for any and all claims, demands, actions, rights of action, and/or judgments by or on behalf of the named person arising from or on account of said procedures and/or treatment rendered in good faith and according to accepted medical standards.

Photo Release

I agree that still photographs and videotapes of me taken during the course of this Skills Canada Saskatchewan activity may be used and reproduced by Skills Canada Saskatchewan in promotional materials.

Code of Conduct

Skills Canada Saskatchewan wants every student representative to have an enjoyable experience with maximum attention on safety and comfort.

To receive maximum benefit from my participation, I acknowledge that the 'Code of Conduct' has been established by Skills Canada Saskatchewan and must be adhered to always.

I note that my participation is voluntary. I agree to abide by the official Skills Canada Saskatchewan rules and regulations. If I do not, I accept that I will forfeit my right to attend and participate. By signing and returning the 'Registration/Release Form' I agree to this 'Code of Conduct'.

1. My conduct shall be exemplary at all times.
2. I will, at all times, wear my official identification badge.
3. I will attend all activities for which I am assigned and registered and will be on time.
4. I will, at all times, respect all public and private property, including the accommodation in which I am housed.
5. I will strictly abide by any curfews established and shall respect the rights of others by being as quiet as possible after curfew.
6. I will refrain from the use of alcoholic beverages and drugs (with the exception of prescription drugs, prescribed by a licensed physician).
7. I will listen and obey instructions from my advisor and/or chaperone.

I agree, if for any reason I am in violation of the rules, I may be brought before the appropriate disciplinary committee for an analysis of the violation(s), and I further agree to accept the penalty imposed on me, with the understanding that all such actions are explained to me, and I further realize that the severity of the penalty may increase with the severity of the violation, even to the extent of being sent home immediately at my own expense.

Violations and Penalties

Violations of items 1 through 7 of the 'Code of Conduct' may be to be sent home at his or her own expense. Proper notification of the violation and action taken will be sent to the school/college responsible for the participant. A copy will also be provided to the Skills Canada Saskatchewan Board of Directors.

It is with the spirit of being a proud and committed participant that I agree to the rules of conduct.

Having read and understood completely the 'Code of Conduct' of Skills Canada Saskatchewan liability, medical release and photo release, I do hereby agree to follow the procedures and practices described.

Tools, Equipment and Materials

- PLEASE NOTE THAT ALL TOOLS, EQUIPMENT AND MATERIALS ARE THE RESPONSIBILITY OF THE COMPETITOR. SKILLS CANADA SASKATCHEWAN WILL NOT BE PROVIDING A STORAGE AREA.

- ALL MATERIALS AND FINISHED PRODUCTS REMAIN THE PROPERTY OF SKILLS CANADA SASKATCHEWAN

2004 Provincial Skills Competition

Release Form

Must be completed and faxed in or e-mailed with the Registration Form

Competition Area:_____ **School Name:**_____

Last Name | First Name | (mm/dd/yy) Date of Birth

Home Street Address | City | Postal Code

E-Mail Address

Home Phone | Age | Health Care # | Year of last tetanus shot

Emergency Contact Person | Phone Number

Family Physician | Phone Number

Do you have any known allergies? Are you taking any medications? Do you have any physical restrictions or special conditions for competing? Do you have any history of: heart condition, diabetes, asthma, epilepsy, rheumatic fever, or other medical conditions? If yes, please list and explain.

I have read and understand completely the "Code of Conduct" of Skills Canada Saskatchewan liability, medical and photo release, I do hereby agree to follow the procedures and practices described. (A Parent or Guardian must sign this form if participant is under 18 years of age).

Skills Canada Saskatchewan will not be responsible for the supervision of Saskatchewan competitors while at the Provincial and/or Canadian Skills Competition. All schools must provide appropriate supervision for their students.

I understand and have read the Safety requirements for my competition area. I understand that if I do not adhere to these safety requirements I may be disqualified from the competition.

Parent or Guardian | Date

Student | Date

Payment: Only cheques will be accepted.

Skills Canada Saskatchewan
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Regina, SK. S4P 3M7
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