UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA
School of Engineering

ENGINEERING Outreach Team

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2026 High School Design Competition

13 March 2026 | UNBC, Prince George Campus

- **Competition website:** https://www.unbc.ca/engineering/high-school-design-competition
- **Contact:** Engineering.Outreach@unbc.ca

Welcome to the annual High School Design Competition, presented by UNBC's School of Engineering! This year's competition poses a thrilling new design challenge, so get ready to design and innovate!

The competition is open to teams of high school students in Grades 10-12. Teams will compete for fabulous prizes, including UNBC tuition credits, School of Engineering swag, and, of course, bragging rights.

Teams must register here before December 1st to participate!

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Eligibility

- All students in **Grades 10, 11, and 12** are eligible to participate.
- Teams can be composed of **2-4 students** and mixed grades are allowed.
- Team members may also attend different schools.
- Students who participated in prior Design Competitions are eligible to compete again!

Student teams must commit to the following:

- ☑ Confirm participation via the registration form (including a team name).
- ☑ Participate in a virtual information session in January 2026.
- ☑ Design apparatus(es) and participate during the competition on **13 March 2026** at UNBC's Main Campus in Prince George.
- ☑ Provide a 5-minute presentation on team's design process, alongside a science fair-style display board, and participate in judge Q&A session during the competition.

Awards

This year's competition will include the award categories provided in **Table 1**. Additional details of prizes for each award will be provided at the competition.

Table 1: *Award categories and prizes for the 2026 competition.*

Award Categories	Category Calculation	Award Prizes*
Grand Champions	Weighted total points awarded across 4 scoring categories.	***UNBC High School Engineering Design Prize:*** $1,000 tuition credit
Design Challenge Award	Total points awarded across design challenge rounds.	***Design Challenge Prize:*** $500 tuition credit
Communication Award	Ranked score determined by competition judges.	***Competition Participant Prize:*** $500 tuition credit
People's Choice Award	Spectator vote on the day of the competition.	***Competition Participant Prize:*** $500 tuition credit

* ***All prize amounts are applied as student account credits once enrolment in a UNBC Engineering program has been confirmed.*** *If a team wins in multiple categories, credit amounts are stackable up to a maximum of $1,500 per competition. Awarded credits are stackable across multiple competitions.*

Design Challenge[1]

Design an apparatus that can transport cargo, regulation size hockey pucks, to their final destinations. **The device can be composed of more than one component, but all components must be powered by a mechanical means, including but not limited to sandbags, springs, or levers.** All design components (including launching and transport apparatuses, weight mechanisms, appendages, springs, sandbags, electronics, etc.) must fit within **a maximum size of 1m (W) x 1m (D) x 1 m (H).**

[1] The Outreach Team graciously credits the School of Engineering at the University of Kansas, whose 2025 High School Design Competition challenge provided inspiration for this year's competition challenge.

Find Challenge Specifications below; any questions about these specifications can be directed to Engineering.Outreach@unbc.ca.

The design challenge competition will feature **3 Rounds**:

Round 1: Travel Over a Mountain	Move a load of 3 pucks over a ramp.
Round 2: Long Haul	Move a load of 4 pucks on a flat path, aiming for a maximum distance of 15 m.
Round 3: Contract Haul	Move an unknown number of pucks to an unknown distance on a flat path.

Teams will also be scored on a presentation and Q&A session with competition judges, as well as the overall costs of the final design. *(Access Competition Scoring & Judging section below.)*

Team Budget & Mentoring

Each team will have **a maximum budget of $150**, generously provided by our industry sponsors. Details on accessing funds and submitting reimbursements are provided below.

We will hold a virtual information session in January 2026 to address team questions or concerns about the competition. Starting in January 2026, a UNBC Engineering student will also be available to mentor each team. To coordinate student mentor meetings, please contact competition organizers at Engineering.Outreach@unbc.ca.

Design Challenge Specifications

Teams must adhere to the following specifications to qualify for this year's design competition.

Apparatus Specifications

The designed apparatus(es) must be able to physically transport the assigned cargo load across the course in each round of the Design Challenge. **An apparatus may not launch, slide, or roll the cargo on its own, and the apparatus must stay in contact with the ground at all times.** Additionally, no element of apparatuses may be remote-controlled.

All components of designed apparatus(es) must:

- ☑ Prioritize safe operation and pose no risk to competition participants, attendees, or property.
  - ➢ Organizers will provide safety glasses during the competition, and competitors are encouraged to use suitable personal protective equipment during their design process.
- ☑ Be free-standing and portable, and able to be re-set in under 2 minutes.
- ☑ Be powered only by mechanical means.
  - ➢ **Any mass or spring used to power the mechanism cannot exceed five Newtons (5 N).** To prevent damage to the gym floor, we ask that any falling mass must be soft, such as a sandbag.
  - ➢ **The use of any fuels, batteries, or compressed gas to power the apparatus mechanisms is prohibited.**
- ☑ Fit within a maximum size of 1 m (W) x 1 m (D) x 1 m (H).
  - ➢ All design components (including launching and transport apparatuses, weight mechanisms, appendages, springs, sandbags, electronics, etc.) must fit within the size constraint.
  - ➢ ***Note the additional size limitations required by the ramp in the first challenge round.***

Competition Surface and the Cargo (Hockey Pucks)

The competition will take place in a basketball gym with conventional finished wood floor.

The cargo for the design challenge will be regulation-size hockey pucks. The School of Engineering will provide each team with hockey pucks to use in their design process. The puck specifications are as follows:

- **Mass:** 170.1 g (6 oz)
- **Dimensions:** 7.62 cm (3 in) diameter x 2.54 cm (1 in) H

The Ramp

In the first competition round, teams must transport their cargo over a ramp. As shown in **Figure 1**, the ramp will be built from Good 1 Side (G1S) Handy Panel plywood (61cm x 122 cm x 1.3 cm / 24" x 48" x ½"). It will have a gentle 5% slope, approximately the same as University Way, the road leading to UNBC campus. To make it safe and easy to use, the ramp will include guard rails and smoothly tapered edges at both the top and bottom.

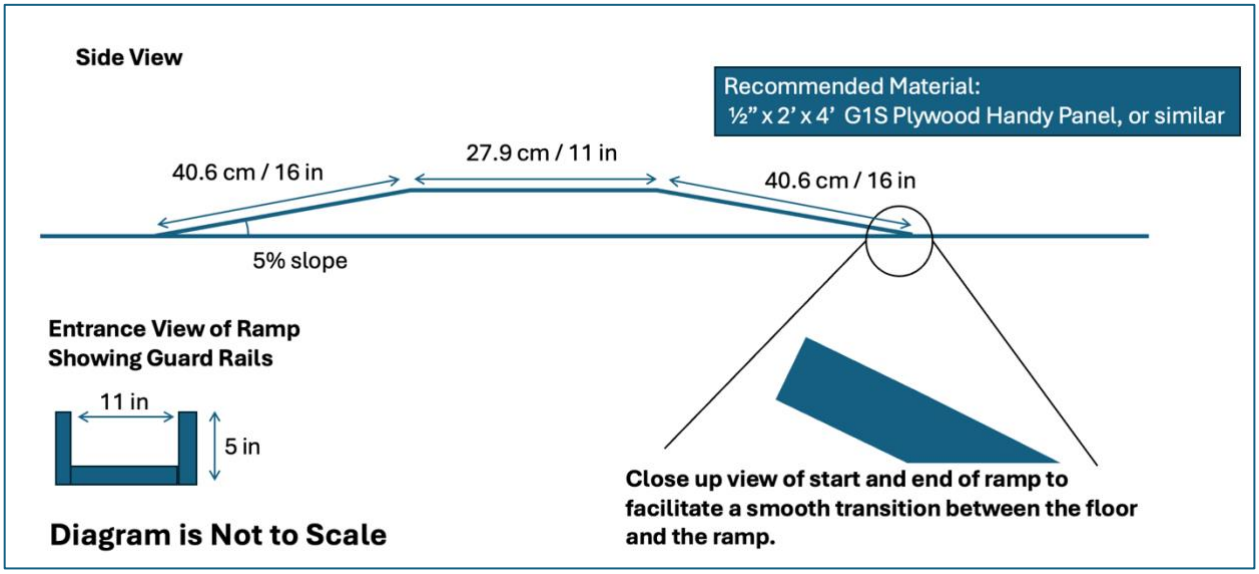

Figure 1: *Diagram of the ramp.*

Teams are encouraged to either build or borrow an official competition ramp as they design and test their apparatus. To temporarily borrow the competition ramp, teams may contact Engineering.Outreach@unbc.ca.

Competition Scoring & Judging

Teams will be scored during the Design Challenge rounds, in a presentation and Q&A about their design alongside a science fair-style display board, and on design costs and material use. Overall competition scoring will be de distributed across the following categories:

(1) Design Challenge Rounds	50%
(2) Presentation + Q&A Session	30%
(3) Design Cost	10%
(4) Use of Materials	10%

(1) Design Challenge Rounds | 50%

For each round, each team will be given three (3) attempts to transport the assigned cargo load to achieve the round's objective. Each round will be scored out of 10 points, calculated by the average of three (3) runs. If any of the runs are unsuccessful or disqualified, the corresponding "0" will contribute to the team's average (out of 3) in the round. **Runs will be disqualified if any part of the team's non-transporting apparatus extends past the 1m (W) x 1m (D) x 1 m (H) size maximum or the launching line.** The cumulative score across all rounds will determine the winning team in the Design Challenge component of the competition.

> ***Note:*** *In each round, teams will make their allotted runs in turn rather than alternating between runs (i.e., Team A makes 3 runs, followed by Team B, etc.). The order for each round will be randomly determined on competition day.*

Round 1: Travel Over a Mountain

Each team will have three (3) attempts to transport a cargo load of three (3) hockey pucks over the ramp and across the finish line (see **Figure 2**). Each team will initially be given 5 minutes to set up their device for the round and 2 minutes between each run, or they forfeit the run. Organizers will place two unsecured 2 x 4's, from the start line to the ramp, as guards to help the apparatus stay on course.

Round 2 Scoring

- Each successful cargo delivery over the ramp and across the finish line will be awarded 10 points. **If the cargo is not delivered to the destination, points will be awarded based on the percentage of the total distance completed** (measured from the start line to the side of the apparatus nearest the Finish Line, rounded to two decimal points, e.g., 87.22%).
- The averaged points out of three (3) runs will determine the total Round 1 score. If any of the runs are unsuccessful or disqualified, the corresponding "0" will contribute to the team's average (out of 3) in the round.

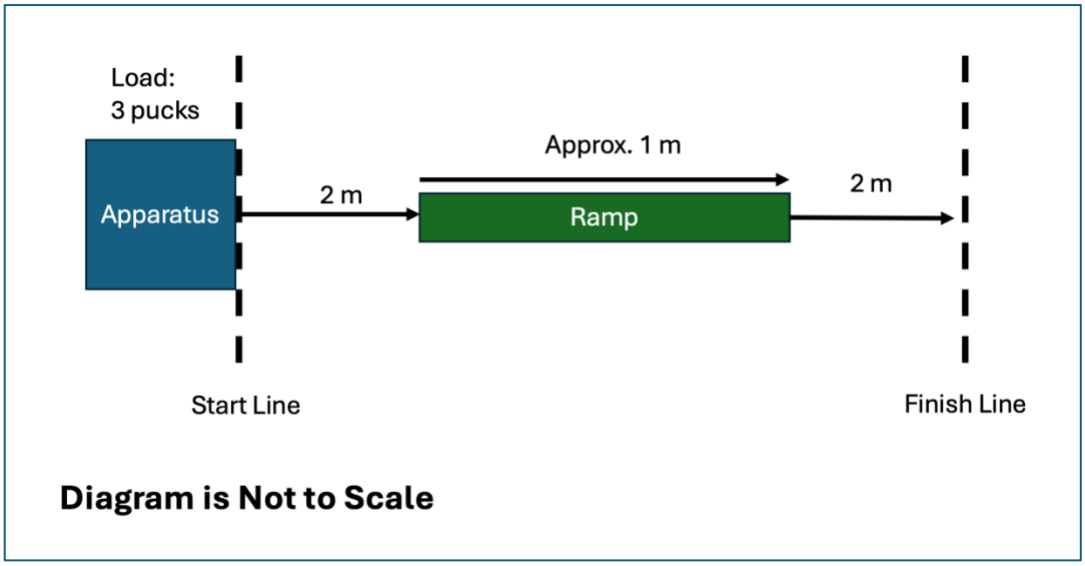

Figure 2: *Diagram of Round 1: Travel Over a Mountain*

Round 2: The Long Haul

Each team will have three (3) attempts to transport a cargo load of four (4) hockey pucks to a maximum distance of 15 m (see **Figure 3**). Each team will initially be given 5 minutes to set up their device for the round and 2 minutes in between the attempts, or they forfeit the run.

Round 2 Scoring

- The averaged distance of the three (3) runs, weighted out of 10, will determine the total Round 2 score. **If any part of the device crosses the 15 m mark, that run will be counted as a "0" toward the average.**

  For example: *If the average distance of three runs is 12.23, that score will be weighted out of 10 to determine the final score in Round 2: (12.23 / 15) x 10 = 8.15 (Measurements will be rounded to the nearest centimetre.)*

- If any of the runs are unsuccessful or disqualified, the corresponding "0" will contribute to the team's average (out of 3) in the round.

Figure 3: *Diagram of Round 2: The Long Haul*

Round 3: The Contract Haul

Each team will have three (3) attempts to transport an unknown load of ***y*** hockey pucks to an unknown destination of ***x*** metres (see **Figure 4**), without exceeding the target destination length. The possible range of ***y*** is 2-6 hockey pucks, and the possible range of ***x*** is 10-20 metres. A random number generator will determine both the numbers. The load and destination will be the same for all teams in Round 3. **In Round 3, each team will initially have 5 minutes to set up their apparatus before their allotted runs. All other teams will be unable to operate their apparatus until their turn in the round.** Each team will then have 2 minutes in between each run, or they forfeit the run.

Round 3 Scoring

- The averaged distance of the three (3) runs, weighted out of 10, will determine the total Round 2 score. **If any part of the device crosses the *x*-metre mark, that run will be counted as a "0" toward the average.**

*For example, if the average distance of three runs is 14.76 (if **x** = 18), that score will be weighted out of 10 to determine the final score in Round 3: (14.76 / 18) x 10 = 8.2 (Measurements will be rounded to the nearest centimetre.)*

- If any of the runs are unsuccessful or disqualified, the corresponding "0" will contribute to the team's average (out of 3) in the round.

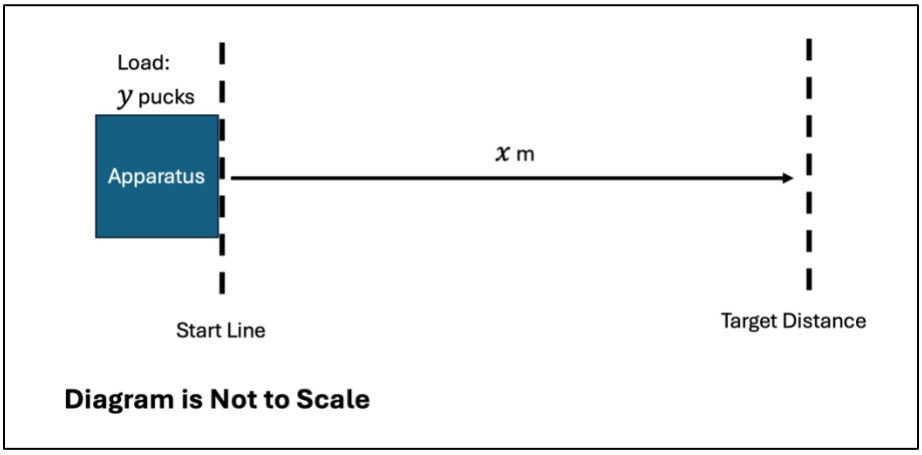

***Figure 4:** Diagram of Round 3: The Contract Haul*

(2) Presentation + Q&A Session | 30%

On the competition day, student teams will be asked to engage with a panel of competition judges by participating in a **5-minute presentation** about their design process, alongside a science fair-style display board, and a **Q&A session**. Competition judges will be made up of industry sponsors and School of Engineering faculty and/or students. Audience members may also ask questions during the Q&A session.

Judges will assess the presentation and Q&A session according to team's ability to provide a clear, concise summary of their design process, and the team's proficiency in justifying technical decisions made within that process.

The team's display board should include, but is not limited to, the following:

- ☑ **Team name**, as well as individual student names, teacher, mentor(s), and school(s) being represented
- ☑ **An overview** section summarizing goals, materials, and final design
- ☑ **Background** detailing theories, principles, and/or energy conversions underlying design
- ☑ **Design process and materials**, including portrayal of the evolution of final design
- ☑ **Design budget**, that details expenses of the design process and costs of the final apparatus
- ☑ **Discussion** of relationship between final design and practical applications
- ☑ **Lessons learned** section, reflecting on design process, team dynamics, future applications, etc.

Teams are encouraged to coordinate on attire, the design of their display board, and any decorations of their apparatus to provide a cohesive and memorable representation of their team dynamic. We also invite teams to jazz up their tables to show their team and school(s) spirit! (Teams will not be judged on their table setup for the Presentation portion of the competition, but attendees will be voting to determine the People's Choice award and might take it into account.)

(3) Design Cost | 10%

Teams will be awarded points based on the overall costs of their final design:

- **The team with the lowest cost will be awarded 10 points**, and all other teams will receive points proportionally to the amount spent on designing and building their apparatus.

These additional points will contribute to teams' overall scores in determining the competition's Grand Champions *(i.e., points in this category do not contribute to determining the Design Competition winning team)*.

Maintaining a Budget

All teams should maintain a budget that documents all expenses for materials used throughout the design process—from prototyping to finished design. For the purposes of the Design Cost component of the competition, any "donated" or "found" materials should be included in the budget at an estimated fair market value.

(4) Use of Materials | 10%

Teams will lastly be awarded points based on their efficient use of materials in their design, determined by the weight of all apparatus components:

- **The team with the lowest total weight of the apparatus(es)—including any non-transport mechanisms; excluding hockey puck cargo—will be awarded 10 points**, and all other teams will receive points proportionally to the weight of their apparatus.

These additional points will contribute to teams' overall scores in determining the competition's Grand Champions *(i.e., points in this category do not contribute to determining the Design Competition winning team)*.

Budgets & Reimbursements

Once teams have confirmed participation via the competitor form, they will have **a maximum budget of $150**. Advising teachers may obtain a partial up-front allowance, and/or they can submit a reimbursement request for design-related expenses.

Teams must keep an internal record of all expenses and retain all receipts to submit to **Engineering.Outreach@unbc.ca**.

- **Allowance:** An up-front allowance of $150 will be made available to each team's advising teacher(s). ***Receipts for each expense are required to document use of allowance funds.***

  Any unused allowance funds must be returned to the School of Engineering by mailing or dropping of a personal cheque to the following address, including a note indicating what you are paying back the difference of the allowance amount for the Engineering HS Design Competition:

  University of Northern British Columbia
  Attn: Accounts Payable (McCaffray Hall 1005)
  3333 University Way
  Prince George, BC Canada V2N 4Z9

- **Reimbursements:** Advising teachers can use this requisition form to request reimbursement if they did not opt to receive an allowance cheque. Complete the Name, Address, Signature, Description and Totals sections in the form. ***Receipts for each expense must be submitted with the requisition form to obtain reimbursement.***