

JUNK DRAWER RACES

GRAVITY POWERED ROBOT RACE

Grade 2 - 3

CHAMPIONSHIP GUIDELINE 2021-22

Last Updated: December 2021

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If you require assistance or have any questions about the contest, please consult the **Junk Drawer Races Frequently Asked Questions** located on our website at www.skillsontario.com/junk-drawer-races or you may contact the Competition Coordinator at junkraces@skillsontario.com.

CHAMPIONSHIP OVERVIEW

The Gravity Powered Robot Race Championship Round consist of the top 3 teams from each division from the regional competition. The Provincial Championship Round will follow the same rules and guidelines as the regional competition, with the exception of the added Provincial Competition Challenge.

Teams competing within the Provincial Championship round will have until February 16th to review their existing blueprints, potentially modify their designs to meet the provincial challenge and construction requirements while explaining their modifications and submit their new submissions via Dropbox. Entries are to be assembled and submitted similar to how they were submitted within the regional competition.

Provincial Submissions will be evaluated by industry volunteers, and the top three teams will be awarded prizes by Skills Ontario. Winning teams will be notified no later than March 10th.

REGISTRATION INFORMATION

Teams that are advancing to the Gravity Powered Robot Race Championship Round will be announced via social media event on January 12th. Teams will also be notified via email that was used during the registration for the regional round. Teams that are advancing to the championship do not need to pay any fees, but teachers are required to register again with the name of the team members this time.

Every team must register for the championship round to participate. Teachers can register the teams on behalf of their students like they did for the regional round. A link to register for the championship round will be shared via email.

Registration Confirmation Email:

A confirmation email will be sent to the registering email. This confirmation email will be sent within 5 business days of registering. A team is not registered for the program until a confirmation email is sent. If the confirmation email is not received within 5 business days, please contact Skills Ontario at junkraces@skillsontario.com. Please be sure to check spam folders.

Registration closes Wednesday, February 16th at 3:00 PM. No exceptions.

If your school or school board is not listed, or if you notice an error, please contact the Competitions Coordinator at junkraces@skillsontario.com.

CHAMPIONSHIP CHALLENGE

Teams that are competing within the Championship Round can choose to use their previous robot walker, or they may create a new design and robot to meet the Championship Challenge.

This year's Gravity Powered Robot Race Championship challenge is:

Create a new Robot Walkers or use the existing one to make them complete a distance of **75 cm** on a ramp. The height of the starting point of the ramp should be **8 inches** at championship level.

Students are required to submit their fastest attempt only.

CHALLENGE OVERVIEW AND JUDGING REQUIREMENTS

Below you will find the description and judging requirements for each section of the Gravity Powered Robot Race.

PART 1: PLANNING & DESIGN

There are three components to the Students' Planning and Design. All three components must be handed in to receive full marks. Submissions will **not be accepted** if students do not include their Mandatory Safety Checklist. All students **MUST** complete the Mandatory Safety Checklist **PRIOR** to beginning their Gravity Powered Robot project, however the checklist only needs to be submitted with the rest of the project files.

Mandatory Safety Checklist

Teams must complete the Mandatory Safety Checklist, which is a full project safety checklist that all entries must submit in order to be eligible to compete. Visit the Resources section of the Junk Drawer Races webpage to download the Mandatory Safety Checklist in .PDF format, located here: www.skillsontario.com/junk-drawer-races

Design Plan

In teams, students are to create a Design Plan of their Gravity Powered Robot Walker and submit their designs within their submission package. Design Plan should be neat, easy-to-read, and should clearly show the design of Robot. Teams are welcome to create their designs by hand or by computer. Teams will be marked on their abilities to build according to their design plans.

Materials List

Teams must include, on a separate piece of paper, a full list of the materials used. This document can be created and formatted however the Team wishes. Teams will be marked on their ability to include all materials used to create their Robot. They must also provide quantity of materials used and will be marked on the legibility and professionalism of this document.

Your Planning & Design Package should include the following three (3) documents:

- Design Plan – Should include all necessary dimensions are labeled (arms, feet, weight, length). It should also include a legend if necessary
- Mandatory Safety Checklist (Can be found in Junk Drawer Races Resource webpage)
- Materials List - Full list of materials used

Teams will be marked on:

- Materials List– Is it legible? Are all materials used listed? Did they use all approved materials? (Up to 5 marks)
- Design Plan – Does the design plan look neat and organized? Was a straight-edge ruler used? Is it legible? Are all measurements to scale? Does the design reflect the build? (Up to 5 marks)
- Accuracy – Are all measurements to scale? (5 marks)

All components of the Planning & Design section must be included with final submission in Dropbox in order to receive marks.

PART 2: CONSTRUCTION CHALLENGE

Once the Students have completed their mandatory safety checklist, materials list and design plan, they are then to begin constructing their projects according to their design plans. Students will be marked on: their ability to follow their design plans, the quality of the construction and the images provided.

Dimensions –

- Total arm lengths cannot exceed **30 cm**
- Total height cannot exceed **20 cm**

Approved Materials:

Approved Paper Products

- Printer paper
- Wrapping paper
- Newspaper

- Tissue Paper
- Toilet Paper or Paper Towel
- Cardboard and other Corrugated materials
- Stiff cardstock
- Any other paper product available – **MUST be a product primarily made of paper**

Approved Sticks and Beads

- Bamboo/wood Skewer Sticks or dowels, max 30cm (12 inch)
- Popsicle sticks
- Plastic or wooden beads
- The use of other materials, such as plastic or wire will **not be permitted**.

All items listed above can be found at most grocery stores, Dollar Stores, Stationary Stores, Walmart, Canadian Tire or Home Hardware stores across Ontario. If you are having difficulty finding these items, please contact junkraces@skillsontario.com.

If you are unsure if a material is approved, feel free to reach out to us at junkraces@skillsontario.com.

Approved Adhesives & Connectors

Students **may use ANY type of adhesive for their robot** but should take into account the type of materials they are using and if it will restrict walk.

Recommended adhesive/connector products:

- 3M scotch tape
- 3M masking tape
- Painters tape
- Duct tape
- Glue stick
- Glue gun
- White glue or carpenter's glue
- Zip Ties

Construction Images for Final Project Submission

Team's construction will be marked upon images submitted and proper materials used.

Three (3) pictures of the Robot from different angles is to be included with the project submission. Those picture angles are to be taken of the:

1. front
2. side (either side)
3. Top

Teams will be deducted marks if three images showing three separate views are not included with their submission package.

Teams will be marked on:

- Build Accuracy – Did the student competitors follow their design plans? Are all features in the designs present on the product? (Up to 5 marks)
- Picture Quality – Did the team include 3 images with the required views? Do the pictures clearly show the Robot? (Up to 5 marks)
- Quality of Construction – Does the Robot look like it will walk? Is it well built? Is it a creative design? (Up to 5 marks)

SAFETY NOTE:

If using a device that requires an electrical source such as a Hot Glue Gun, please ensure a teacher, parent or guardian is supervising at all times.

PART 3: WALK TEST

Once the Student Competitors have completed constructing their Robots and have taken photographs for their submission entries, students are to now let their robots walk on a ramp. The height of the starting point of the ramp should be **8 inches** at championship level.

The Student Competitors are to “nudge” their Robots by hand from a stationary position/starting point on the ramp. A long enough cardboard/sheet or a wooden plank can be used as a ramp by the students. If it is determined by the judges that the height of ramp is more than 8 inches, 5 marks may be deducted. They may perform multiple walk test, with the goal of fastest walk. ***The students are to video record their walk tests, but they are only required to submit their fastest attempt only which means only ONE ATTEMPT.*** Points will be awarded based on the time taken to complete the distance of **75 cm**. Tiebreakers will be determined to the nearest tenth of a second.

The video must capture the entire walk of the Robot at all times. At no point in the video can the Robot escape the frame of the video. Teams must plan their walk tests and video shot carefully in order to ensure the Robot does not leave the video frame. Students *must mark the start and end point on the ramp* and the distance between the two must be 75 cm. Once in the video, the teams must use a measuring tape to show the judges, the distance between start and end point. The fastest walk attempt out of the three attempts will be considered as a final race submission.

Teams will be marked on:

- Video – has it met all criteria? (Submitted on time and titled in proper format, robot does not leave frame; start and end points are within the entire frame during walk)
- Time taken by the robot to complete the 75 cm distance

SAFETY NOTE:

Students should use a safe indoor area, such as a classroom, school gymnasium or an activity room to perform a walk test.

BONUS: VISUAL APPEAL

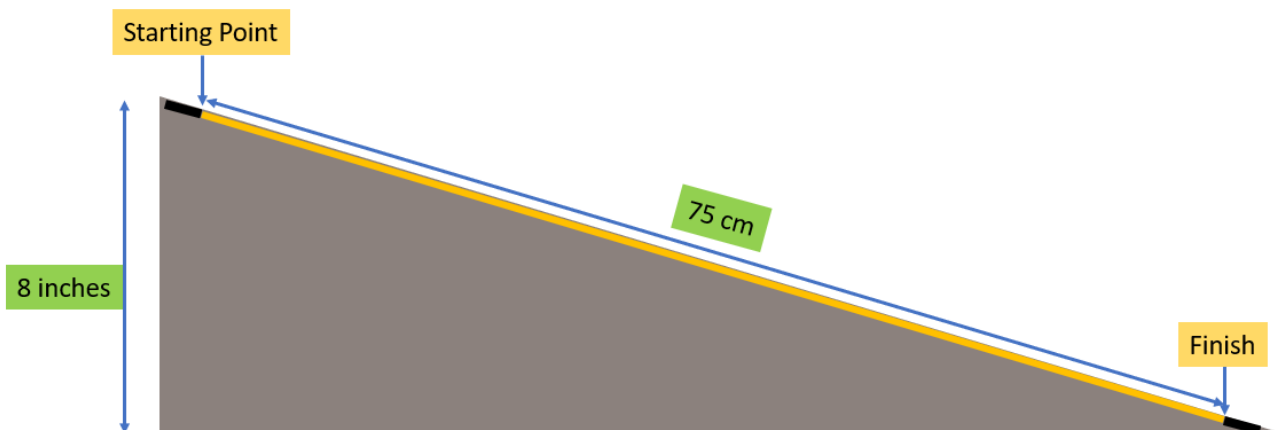
Teams have the option to decorate their Gravity Powered Robot projects but must do so using specific materials that do not provide a structural advantage. Students may only use decorations such as colourful construction paper, markers, crayons, paint, glitter, etc.

Some examples of decorations that could provide an unfair advantage are:

- Wire
- Pipe Cleaners
- Non-Paper materials, such as aluminum foil, saran wrap or plastic

Any decorations that appear to be aiding in the structural integrity of the Robot will result in a 5-point penalty. If a team is unsure if a certain decoration material is allowed to be used, they may email the Competitions Coordinator at junkraces@skillsontario.com.

Ramp Structure For Championship Round of Robotic Walker



SCORING

Category	Maximum Points												
Part 1: Planning & Design package													
Materials List- Is it legible? Are all materials used listed? Did they use all approved materials?	5												
Professionalism – Does the Design Plan look neat and organized? Was a straight-edge ruler used? Is it legible?	5												
Accuracy – Are all measurements to scale?	5												
Mandatory Safety Checklist - submitting this is an automatic 5 points. If an entry does not include a Safety Checklist, the entry will be disqualified	5												
Total Planning and Design	20 points												
Part 2: Construction													
Build Accuracy – Did the Student Competitors follow their design plans? Are all features in the designs present on the product?	5												
Picture Quality – Did the team include 3 images with the required views? Do the pictures clearly show the Robot?	5												
Quality of Construction – Does the Robot look like it will walk? Is it well built? Is it a creative design?	5												
Total Construction	15												
Part 3: Walk Test													
Points Breakdown	One Attempt Only												
<table border="1"> <thead> <tr> <th>Time</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>Less than 5 seconds</td> <td>20 points</td> </tr> <tr> <td>5 – 6.99 seconds</td> <td>18 points</td> </tr> <tr> <td>7 – 8.99 seconds</td> <td>15 points</td> </tr> <tr> <td>9 – 11.99 seconds</td> <td>10 points</td> </tr> <tr> <td>12 seconds and above</td> <td>5 points</td> </tr> </tbody> </table>		Time	Points	Less than 5 seconds	20 points	5 – 6.99 seconds	18 points	7 – 8.99 seconds	15 points	9 – 11.99 seconds	10 points	12 seconds and above	5 points
Time		Points											
Less than 5 seconds		20 points											
5 – 6.99 seconds		18 points											
7 – 8.99 seconds		15 points											
9 – 11.99 seconds		10 points											
12 seconds and above	5 points												
Quality of Video	10												
<ul style="list-style-type: none"> Was the Robot within the frame at all times? Was always the start and end points in the frames? Was it clear in the video , the distance covered, and did the student measured the distance accurately? 													
Any Penalties	()												
VISUAL APPEAL BONUS MARKS	5												
<ul style="list-style-type: none"> Did the team use approved decoration materials? Is the decoration appropriate? 													

Important Points:

1. All judging is final. Individual final scores will not be shared with teams.
2. Students are encouraged to work in a team and every student must have a different responsibility (keeping the time, measuring the distance, nudging the robot)
3. If the robot stops before the finish line, a student can nudge it from the same point, 1 point will be deducted for every push.

Tiebreaker

In the event of a tie between two or more teams, ties will be broken by using the score from the Walk Test.

SUBMISSION PACKAGE

Team's submissions for the Championship Robot Race round are to include the following media in the following formats:

Part 1 – Design Plan Package

- A copy of the Gravity Powered Robot Walker Design Plan is required to be submitted. These can be created and submitted in: .PDF, .JPEG, .DOCX (Word or Excel). Any other formats will not be accepted. Must be saved as "Design Plan"
- Material List is required to be created and submitted in: .docx, .xls or .pdf format (MS Word or Excel). Must be saved as "Materials List"
- Mandatory Safety Checklist to be downloaded, answered, and submitted in: .docx, .xls or .pdf format (MS Word or Excel). Must be saved as "Mandatory Safety Checklist – Completed"

Part 2 – Construction Photographs

- Three (3) pictures of the Robot are required to be submitted (Front, Side and Top). These can be received in: .PDF, .JPEG. Any other formats will not be accepted.
- The three (3) pictures must each be saved as: "robot_top", "robot_side", "robot_front".

Part 3 – Walk Test

- **One (1) attempts within 1 unedited video** is required to be submitted. Video submission formats accepted are: .MP4 and .AVI.
- This file must be titled "Walk Test".

The Gravity Powered Robot Walker Submission Package should contain the Team's design plan, materials list, three (3) photographs of the constructed Robot Walker, and the video recording of their Fastest Walk test online. **Registered Teams will have until February 23rd by 3:00 PM** to submit their Submission Package to the Dropbox folder.

Submitting to Dropbox

Teams are to collect all parts of their submission within a folder and submit their final submission package within the Skills Ontario Junk Drawer Races webpage at <https://www.skillsontario.com/junk-drawer-races#Submission>. Teachers may assist with the Safety Checklist, if required.

Project submissions must be submitted in a specific naming format in order to receive marks. If a team does not name their submission package in the following naming convention, their submission may be disqualified from competition.

STUDENTS: Be sure to have all 5 components of your project saved within a compressed .ZIP file folder. The .ZIP file MUST be titled using your school's name and school board initials if there was only one team. If the school had more than one team during the regional round, the title should include the team number (team 1 or team 2 or team 3). Please use the same team number from the regional round.

Teams may ask their teacher(s) for assistance in creating a zip file folder. You may also watch this video (<https://www.youtube.com/watch?v=lpn-T5Um3d4>) to learn how to create a zip file folder.

For example, if your school is St. Mary's Elementary School in Waterloo Catholic District School Board, your file must be titled: "stmarys.wcdsb.ZIP" if there was only one team from the school. In case the school had two or three teams, the .zip file should be titled as "stmarys.wcdsb.team1.zip" or "stmarys.wcdsb.team2.zip" or "stmarys.wcdsb.team3.zip".

NOTE: Your full submission package should include a total of 5 documents that is a part of the 3 sections noted in the guidelines of every contest.

IMPORTANT DATES

Event	Date
Registration for Regional Competitions Opens	Oct. 12 th , 2021, at 9:00 AM
Registration for Regional Competitions Closes	Nov. 26 th , 2021, at 4:00 PM
Submissions for Regional Competitions Due	Dec. 9 th , 2021, at 2:00 PM
Regional Competitions Winners Announced	January 12 th , 2022, VIA Social Media
Championship Round Challenge Announced	January 12 th , 2022

Championship Round Registration Opens	January 12 th , 2022
Championship Round Registration Closes	February 16 th , 2022 at 3:00 PM
Championship Round Submissions Due	February 23 rd , 2022, at 3:00 PM
Championship Round Winners Announced	March 23 rd , 2022, VIA Social Media

*All important dates are subject to change.

RESOURCES

To learn how to build this activity and see how it functions, you can refer to the links below:

- <https://www.instructables.com/Gravity-Powered-Robot-Walker/>
- <https://www.youtube.com/watch?v=ITTcWrsI93s>

Note: The links are for reference only, you may learn from these, but your submission shouldn't be identical. If it is found to be identical by the judges, your submission may not be considered for marking.

QUESTIONS?

Should you have any questions regarding this competition, please don't hesitate in contacting the Competitions Coordinator at junkraces@skillsontario.com.

Thank you to our Sponsor. Merci à notre commanditaire.



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