



# **JUNK DRAWER RACES**

## **PAPER GLIDER COMPETITION**

### **Grade 6 - 7**

## **Competition Guideline and Overview 2021-22**

*Last Updated: September 2021*

## TABLE OF CONTENTS

Program Overview	Page 2
Program Registration Information	Page 2
Regional Divisions	Page 3
Contest Overview	Page 5
Challenge Overview and Judging Requirements	
Part 1: Planning and Design Package	Page 5
Part 2: Construction	Page 6
Part 3: Flight Test	Page 8
Part 4: Skilled Trades Test	Page 9
BONUS: Visual Appeal	Page 9
Scoring	Page 10
Submission Package	Page 11
Submitting to Dropbox	Page 12
Important Dates	Page 12
Provincial Championships	Page 13
Resources	Page 13
Questions	Page 13

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](http://www.skillsontario.com/junk-drawer-races) or you may contact the Competition Coordinator at [junkraces@skillsontario.com](mailto:junkraces@skillsontario.com).

## PROGRAM OVERVIEW

Introducing the first-ever Skills Ontario's Junk Drawer Races! The contests under this program are open to students from Grades 2 - 12 within Ontario. Last year we launched Paper Glider Competition for grades 7-12 and this year we are announcing new competitions for different grades. Please refer to table below for these competitions.

Competition	Grades	Related Topics from Curriculum
Gravity Powered Robot Walker Race	2-3	Simple Machines   Movement   Strong and Stable Structures   Forces Causing Movement
Cardboard Car Race	4-5	Wheels   Forces Acting on Structures and Mechanisms
Paper Glider Competition	6-7	Flight Technology   Designing   Building   Testing   Centre of Gravity
Hydraulic Crane Challenge	8	Hydraulics   Fluids   Systems in Action
Cardboard Hovercraft Race	9-12	Manufacturing Technology   Technological Design   Transportation Technology

### Number of Teams and its size:

One team of up to four (4) students can participate from every school for every contest. To ensure fairness and access to programs across the province, each school board is entitled to spaces at Elementary, Sr. Elementary and Secondary levels for both their online and in-person learning streams.

Virtual schools/hubs can register one team per contest just like in-person schools. Virtual class/es of a school that also has in-person classes can only register one team per contest which can be either from an in-person class, virtual class, or a collaboration of both. This competition is also open to private schools.

If you have any questions or concerns about registration spaces for your school board, please contact the Competitions Coordinator at [junkraces@skillsontario.com](mailto:junkraces@skillsontario.com).

Teams can register by visiting [www.skillsontario.com/junk-drawer-races](http://www.skillsontario.com/junk-drawer-races). A registration confirmation email will be sent to the registering email address within five business days.

## PROGRAM REGISTRATION INFORMATION

**Registration for all contests open on Tuesday, October 12<sup>th</sup> at 9:00 am! Please visit [www.skillsontario.com/junk-drawer-races](http://www.skillsontario.com/junk-drawer-races) to begin the registration process.**

Every school must register for all the contests separately by selecting the correct drop down from the registration form. If schools have more teams wishing to compete for a contest, they are

encouraged to host a competition at school level to decide the team that represents the school. This competition could be held within a Gymnasium if permitted.

Teachers can email [junkraces@skillsontario.com](mailto:junkraces@skillsontario.com) regarding any questions to hosting an internal school competition.

### 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](mailto:junkraces@skillsontario.com). Please be sure to check spam folders. It is important that all teachers at the school coordinate which team will represent the school. If a school has a second team who registered, Skills Ontario will notify both registered teams and advise them that they must select only one team to participate.

**Registration closes Tuesday, November 16<sup>th</sup> at 4:00 PM. No exceptions.**

## REGIONAL DIVISIONS

For the purpose of this competition, Skills Ontario has divided the 76 public school boards across Ontario into regional divisions as per their geographic location. Similar to the regional divisions of the Qualifying Competition that leads to the Skills Ontario Provincial Competition. There are 7 regional divisions.

**A team must place within the top 3 of their regional division during the Regional Competition that concludes on January 12<sup>th</sup> to be eligible for the Provincial Championships.**

**Refer to the table below to review which Regional Division your School Board belongs to. This is the division in which your team will compete within during the Regional Competition.**

Central Ontario	Far Northern Ontario
Durham Catholic District School Board	Conseil scolaire de district catholique des Aurores boréales
Durham District School Board	Keewatin-Patricia District School Board
Dufferin-Peel Catholic District School Board	Kenora Catholic District School Board
Peel District School Board	Lakehead Public Schools
Toronto Catholic District School Board	Northwest Catholic District School Board
Toronto District School Board (All Quadrants)	Rainy River District School Board
York Catholic District School Board	Superior North Catholic District School Board
York Region District School Board	Superior-Greenstone District School Board
	Thunder Bay Catholic District School Board

<b>Eastern Ontario</b>	
Algonquin and Lakeshore Catholic District School Board	<b>Northern Ontario</b>
Catholic District School Board of Eastern Ontario	Algoma District School Board
Conseil des écoles catholiques du Centre-Est	Conseil scolaire catholique du Nouvel-Ontario
Conseil scolaire de district catholique de l'Est ontarien	Conseil scolaire catholique de district des Grand Rivières
Conseil des écoles publiques de l'Est de l'Ontario	Conseil scolaire de district catholique Franco-Nord
Hastings and Prince Edward District School Board	Conseil scolaire public du Grand Nord de l'Ontario
Limestone District School Board	Conseil scolaire public du Nord-Est de l'Ontario
Ottawa Catholic School Board	District School Board of Ontario North East
Ottawa-Carleton District School Board	Huron-Superior Catholic District School Board
Renfrew County Catholic District School Board	Near North District School Board
Renfrew County District School Board	Nipissing-Parry Sound Catholic District School Board
Upper Canada District School Board	Northeastern Catholic District School Board
	Rainbow District School Board
<b>Southern Ontario</b>	Sudbury Catholic District School Board
Brant Haldimand-Norfolk Catholic District School Board	
Conseil scolaire catholique MonAvenir	<b>Near Northern Ontario</b>
Conseil scolaire Viamonde	Bluewater District School Board
District School Board of Niagara	Bruce-Grey Catholic District School Board
Grand Erie District School Board	Kawartha Pine Ridge District School Board
Halton Catholic District School Board	Peterborough Victoria Northumberland and Clarington Catholic District School Board
Halton District School Board	Simcoe County District School Board
Hamilton-Wentworth Catholic District School Board	Simcoe Muskoka Catholic District School Board
Hamilton-Wentworth District School Board	Trillium Lakelands District School Board
Niagara Catholic District School Board	Upper Grand District School Board
<b>Western Ontario</b>	Wellington Catholic District School Board
Avon Maitland District School Board	
Conseil scolaire catholique Providence	
Greater Essex Country District School Board	
London District Catholic School Board	
Lambton Kent District School Board	
St. Clair Catholic District School Board	
Thames Valley District School Board	
Waterloo Catholic District School Board	
Waterloo Region District School Board	
Windsor-Essex Catholic District School Board	

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

## CONTEST OVERVIEW

Teams of up to four (4) students from grades 6-7 are to design and build a glider plane made out of paper products and toothpicks or wood skewer sticks. Once the Paper Glider Planes are built, the teams are to then test their capabilities by launching the Planes by hand from a Stationary (sitting or standing) position to determine the Glider Plane can stay in the air the longest. Teams are required to video record their Flight test attempts.

## CHALLENGE OVERVIEW AND JUDGING REQUIREMENTS

Below you will find the description and judging requirements for each section of the Paper Glider Competition.

### 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 Paper Glider Plane 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](http://www.skillsontario.com/junk-drawer-races).

#### Design Plan

In teams, students are to create a Design Plan of their Paper Glider Plane project and submit their designs within their submission package. Design Plan should be neat, easy-to-read, and should clearly show the design of Paper Glider. 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 Paper Glider Plane. 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 (Wingspan, 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 Wingspan cannot exceed **90cm**
- Total Length cannot exceed **90cm** (nose to tail)

**Approved Materials:**

**Approved Paper Products**

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

## Approved Sticks

- Toothpicks
- 30cm (12 inch) bamboo/wood Skewer Sticks
- Popsicle sticks
- The use of other materials, such as dowels, 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](mailto:junkraces@skillsontario.com).

If you are unsure if a material is approved, feel free to reach out to us at [junkraces@skillsontario.com](mailto:junkraces@skillsontario.com).

## Approved Adhesives & Connectors

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

### Recommended adhesive/connector products:

- 3M scotch tape
- 3M masking tape
- Painters tape
- Duct tape
- Super Glue
- 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 Glider Plane from different angles are 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 Glider Plane? (Up to 5 marks)
- Quality of Construction – Does the plane look like it will fly? 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: FLIGHT TESTS – LONGEST FLIGHT**

Once the Student Competitors have completed constructing their Paper Glider Planes and have taken photographs for their submission entries, students are to complete a flight test of their Paper Glider Planes.

The Student Competitors are to “launch” their Paper Glider Planes by hand from a stationary position. The Planes cannot be released higher than 1.5 metres off the ground. If it is determined by the Judges that a competitor launched their plane above this height, appropriate marks will be deducted from their score. They are to perform 3 flight tests, with the goal of longest flight. The students are to video record their flight tests. A point will be awarded for each second of flight achieved. Tiebreakers will be determined to the nearest tenth of a second.

The Flight Tests consists of three (3) consecutive tests. In order to ensure that Students are using three consecutive tests, the flight test video must be shot in **ONE CONTINUOUS VIDEO – NO EDITING!**

The video must capture the entire flight of the Paper Glider Plane at all times. At no point in the video can the Paper Glider Plane escape the frame of the video. Teams must plan their flight tests and video shot carefully in order to ensure the Plane does not leave the video frame. A team may pan their camera to follow the Plane during flight. One (1) point will be deducted for each time the Plane leaves the video shot.

**Teams will be marked on:**

- Video – has it met all criteria? (Submitted on time and titled in proper format, Plane does not leave frame; Launcher is within the entire frame during launch)
- Points per Attempt (3 attempts max)
  - One point awarded for one full second of flight. Points will be awarded to the nearest Tenth of a second (.0)

**SAFETY NOTE:**

Students should use a large, safe indoor area, such as a school gymnasium, to perform a flight test. Students may use a large, clear outdoor area, such as a soccer field, but should ensure that a teacher/parent/guardian is present and that there are no hazards present (i.e. electrical wires above, vehicles, other people, animals, etc.)

## **PART 4: SKILLED TRADES TEST**

Teams are to include with their Flight test submission, answers to the Junk Drawer Races Skilled Trades Test, which can be downloaded from [www.skillsontario.com/junk-drawer-races](http://www.skillsontario.com/junk-drawer-races).

The Junk Drawer Races Skilled Trades Test requires the students to find the answers to 10 multiple choice questions that are based upon the Skills Ontario website, OYAP program website and Skilled Trades within Ontario.

## **BONUS: VISUAL APPEAL**

Teams have the option to decorate their Paper Glider Plane 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 Paper Glider Plane 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](mailto:junkraces@skillsontario.com).

## SCORING

Category	Maximum Points
<b>Part 1: Planning &amp; Design package</b>	
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
<b>Total Planning and Design</b>	<b>20 points</b>
<b>Part 2: Construction</b>	
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 Glider Plane?	5
Quality of Construction – Does the plane look like it will fly? Is it well built? Is it a creative design?	5
<b>Total Construction</b>	<b>15</b>
<b>Part 3: Flight Test</b>	
3 attempts	1 point per 1 second in the air during Flight
Quality of Video	10
<ul style="list-style-type: none"> <li>Was the plane within the frame at all times?</li> <li>Was the entire body of the “Launcher” within the frame during Launch</li> <li>Was it clear in the video where the plane <i>first</i> landed?</li> </ul>	
<b>Total Flight Test Challenge</b>	
<b>Part 4: Skilled Trades Knowledge</b>	
Questions 1 – 10	10
Bonus Question	5
<b>Total Skilled Trades Knowledge</b>	<b>15</b>
<b>VISUAL APPEAL BONUS MARKS</b>	
<ul style="list-style-type: none"> <li><b>Did the team use approved decoration materials? Is the decoration appropriate?</b></li> </ul>	<b>5</b>
<b>TOTAL MARKS</b>	

### **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, launching the plane)

### **Tiebreaker**

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

## **SUBMISSION PACKAGE**

Team's submissions for the Regional Paper Glider Plane round are to include the following media in the following formats:

### **Part 1 – Design Plan Package**

- A copy of the Paper Glider Plane 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 Paper Glider Plane 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: "plane\_top", "plane\_side", "plane\_front".

### **Part 3 – Flight Test**

- **Three (3) attempts within 1 continuous video** are required to be submitted. Video submission formats accepted are: .MP4 and .AVI.
- This file must be titled "Flight Test".

### **Part 4 – Skilled Trades Question Answers**

- Answers to the three (3) Skilled Trades Questions are required to be submitted. Submission formats accepted are: .JPEG, .PDF and .DOCX (Word or Excel) and can be no larger than 1GB in size

- This document must be titled "Skilled Trade Test Answers".

The Paper Glider Plane Submission Package should contain the Team's design plan, materials list, three (3) photographs of the constructed Paper Glider Plane, their written answers to the Skilled Trades Questions, as well as the video recording of their Longest Flight test online. **Registered Teams will have until December 1<sup>st</sup> at 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 [www.skillsontario.com/junk-drawer-races](http://www.skillsontario.com/junk-drawer-races) by clicking the blue "Submit your Project" button.

Junk Drawer Races 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 6 components of your project saved within a compressed .ZIP file folder. The .ZIP file MUST be titled using your school name and school board initials.

*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".*

**NOTE: Your full submission package should include a total of 6 documents that is a part of the 4 sections above.**

## IMPORTANT DATES

Event	Date
Registration for Regional Competitions Opens	Oct. 12 <sup>th</sup> , 2021, at 9:00 AM
Registration for Regional Competitions Closes	Nov. 16 <sup>th</sup> , 2021, at 4:00 PM
Submissions for Regional Competitions Due	Dec. 1 <sup>st</sup> , 2021, at 3:00 PM
Regional Competitions Winners Announced	January 12 <sup>th</sup> , 2022, VIA Social Media
Championship Round Challenge Announced	January 12 <sup>th</sup> , 2022
Championship Round Registration Opens	January 12 <sup>th</sup> , 2022
Championship Round Submissions Due	February 16 <sup>th</sup> , 2022 at 3:00 PM
Championship Round Winners Announced	March 10 <sup>th</sup> , 2022, VIA Social Media

\*All important dates are subject to change.

## PROVINCIAL CHAMPIONSHIPS

The Provincial Paper Glider Championship Round will consist of the top 3 teams from each regional 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. **The Provincial Championship Challenge will be revealed when the advancing teams are announced on January 12<sup>th</sup>, 2022.**

Teams competing within the Provincial Championship round will have until February 16<sup>th</sup> 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. Provincial submissions follow the same guidelines as the regional competition, but with the addition of the Provincials Challenge. Entries are to be assembled and submitted similar to how they were submitted within the regional competition.

Provincial Submissions will be judged and 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 10<sup>th</sup>.

### NOTE:

The above Provincial Championship guidelines and dates are subject to change at any time. An official Skills Ontario Paper Glider Plane Championship guideline will be released to advancing teams upon the conclusion of the Regional round.

## RESOURCES

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

- <https://www.youtube.com/watch?v=GdZiesdZXbA>
- <https://www.youtube.com/watch?v=x-rcysOPn-4>

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](mailto:junkraces@skillsontario.com).

**Thank you to our Sponsor. Merci à notre commanditaire.**



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