★National Finals（全国大会）用★

STEM RACING™ JAPAN

2025/26 PRIMARY COMPETITION REGULATIONS

Welcome to the world of STEM Racing, you're in for an exciting ride!

The STEM Racing Japan Primary Class is your first step on the way to becoming World Champions, starting off with the chance to be crowned Primary Champion in your first season...

This guidebook contains everything you need to know to design and make a car, ready to compete at STEM Racing Japan Race Day. It's as easy as 1,2,3 – or in our case, Design, Make, Race!

The Japan Primary Class is an introductory competition designed for primary school students to experience STEM Racing in a simple, fun, and safe way.

This class focuses on the core elements of STEM Racing: Car Scrutineering and Racing.
To lower the barrier to participation, this class is conducted as an individual competition.
No team formation, design portfolio, pit display, or verbal presentation is required.

Eligibility & Participation

The STEM Racing Japan Primary Class is open to students aged **6 to 12** during the year of the competition. For the 2026 Japan National Finals, Entry Class will be conducted as an individual competition. This format applies to the Japan National Finals only. Participants may receive support from teachers, parents, or guardians in manufacturing and preparation. However, the **design intention and final submission must represent the participant's own ideas**.
Each participant may enter **one (1) car only**.

Project Management Plan

1. REGISTER AND READ THE RULES!

Register your information and read this guide very carefully one section at a time, so your design will be fit to race.
STEM Racing Japan Registration

2. GET YOUR PRIMARY CLASS STARTER KIT FROM ICC

The starter kit conains all the standard components required to desin and make your STEM Racing Primary Car.

3. DESIGN THE F1® CAR OF THE FUTURE

Have a go at our IsoSketch® tutorial, which shows you how to sketch the basic chassis of your STEM Racing Primary Class Car.
Then start designing a super cool aerodynamic body and some sleek wings onto the chassis.
Remember no idea is too crazy at this stage, so do loads of sketches to experiment.

4. START MAKING YOUR CAR!

Test and modify your racing car, using your knowledge of aerodynamics and forces to inform your decision-making.
To book a test day, please contact us at (contact@stemracing.jp). Advance booking is required.

5. TEST & MODIFY YOUR CAR!

You will test and modify your racing car. Using their knowledge of aerodynamics and forces to inform their decision making.
For testing your car, please contact us (contact@stemracing.jp) to arrange the test day at TiB (Tokyo Innovation Base).
Advance booking is required.

6. ROCK UP ON RACE DAY!

Attend the STEM Racing Japan National Finals ready to compete!

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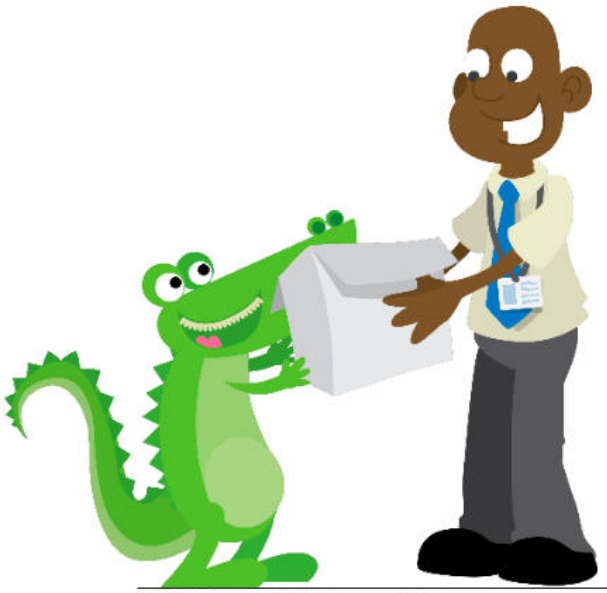


What is STEM Racing?

Hello and welcome to STEM Racing Challenge in Japan!

We are excited to welcome you to this exciting challenge and hope you enjoy working to take on this life-changing experience.

STEM Racing (formerly F1 in Schools) is an international STEM education program supported by Formula 1. Students learn through a hands-on engineering challenge: designing (CAD), manufacturing (e.g., 3D printing/CNC), testing and analyzing performance, and communicating their ideas.

In the team-based classes, students typically form teams of 3–6 and race a miniature formula-style car on a 20-meter straight track, powered by an official power unit cartridge, under strict technical and safety regulations.

Through the project and competition experience, students develop practical skills needed in the real world—engineering thinking, project management, teamwork, and communication—and broaden their interest in STEM fields and future pathways across industries such as mobility, aerospace, manufacturing, and digital technology.

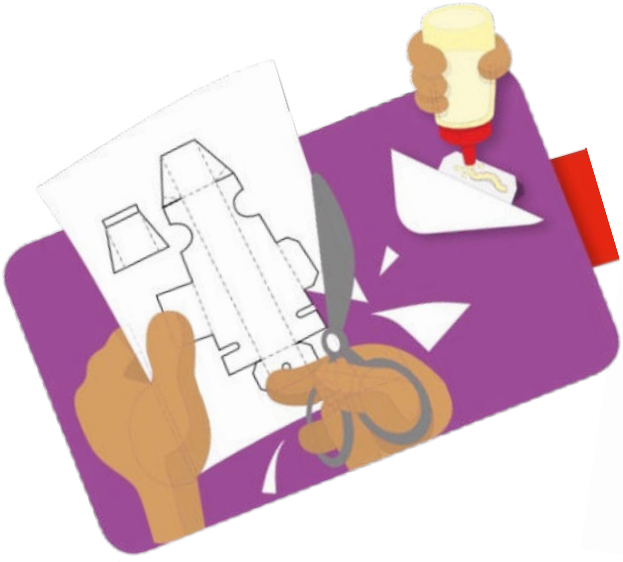
Globally, STEM Racing has engaged over 1.9 million students from 28,000+ schools across 65+ countries (with around 35% female participation reported).

STEM Racing Japan Primary Class (6–12) is an introductory Paper-Car category.
It focuses on scrutineering, designing and racing as a first experience, and students can progress to make 3D printing STEM Racing Car in the next stage.

Best of luck — we can't wait to see your ideas come to life on Race Day!

CAR DESIGN

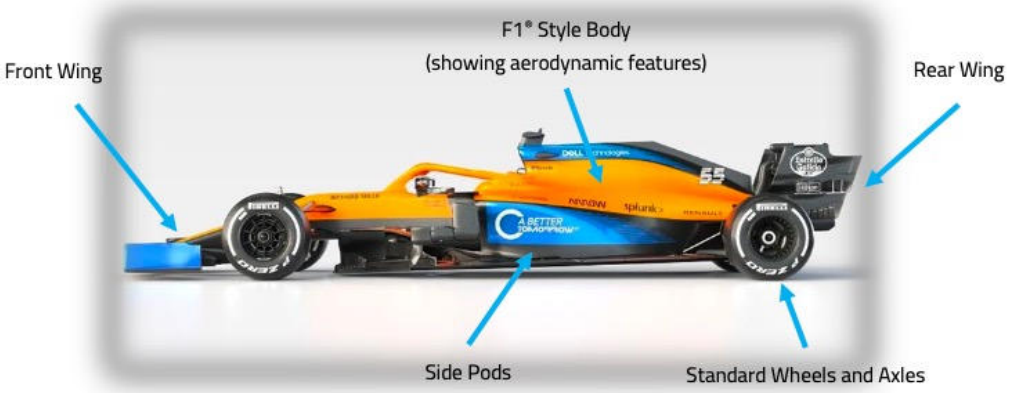
What is a Primary Class Car?
What is the 'Standard Chassis'?
Design Brief
Technical Regulations



What is a Primary Class Car?

Sometimes, we use words that describe parts of a car, which you might not have heard before. This page introduces you to some of these terms, so you'll understand what they mean and be able to use them to describe your own car! *Read through the following pages very carefully as a team!*

Your F1® in Schools Primary Class Car must have these features:



What is the Car Body?

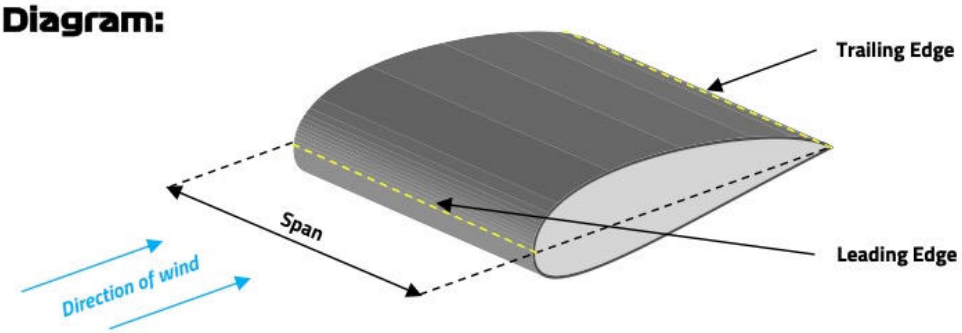
The car body is the main shape of your Primary Class car. It is the exterior (outside) of the car including the front and rear wings and all other surfaces that you can see from the outside. The car body must be made from card

Wings - Commonly Used Terms:

- A **Leading Edge** is the edge of the wing that cuts through the air first (i.e. the front edge).
- The **Trailing Edge** is the edge that the air touches last as it leaves the wing (i.e. the back edge).
- **Wing Span** is a bit like the arm span of a human, or the wing span of a bird or plane. It is the total width between the ends of the wing, including the nose cone or body of the car.

These terms are all shown on the diagram below, make sure you understand what they all mean!

Wing Diagram:



The 'Standard Chassis' and Engine Housing

What is a Chassis?

A car's chassis is a bit like a human skeleton. Just like a skeleton, a car's chassis is normally hidden underneath the surface so you can't see it, but it's the strong frame-like structure that holds all the important parts of a car together. In our case, the metal axles, plastic wheels, card engine housing and card body will all attach to the chassis, so it's a really important part of your race car.

What is an Engine Housing?

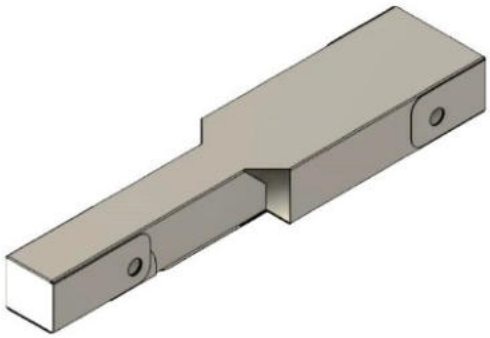
The engine housing is like the compartment under a car's bonnet where the engine lives, it's a strong structure that contains the engine, so it doesn't get out and drive away itself! In STEM Racing, the engine housing is a specially designed card chamber (like an open-ended box) that fits to the back of the car, containing the compressed air power pack (your car's engine!). Your car MUST have this to compete.

Safety First:

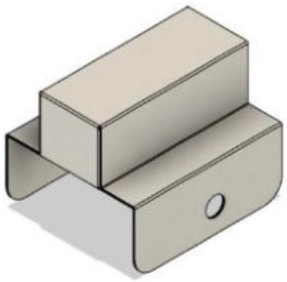
Primary Class cars **must be safe to race** down our 20m elevated racetrack, powered by a compressed air power pack. To ensure this, the STEM Racing rules committee has created a 'standard chassis' that **car designers MUST use as a minimum** for their car. The 'standard chassis' has been carefully designed so you can still make your Primary Class car look like a real F1® racing car, so use all your imagination and styling ideas to make sure the body of your car completely hides the chassis hiding underneath it!
It is a SAFETY regulation that you use the standard chassis and engine housing as shown below, so make sure you cut and assemble these really carefully to avoid losing out on lots of points!

Isometric (3D) views:

Chassis:



Engine Housing:

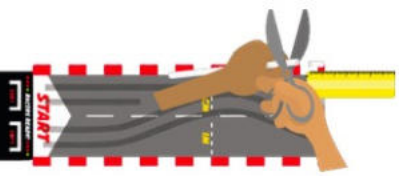


Note: The best way to start designing your Primary Class car is to watch our **IsoSketch® tutorial on YouTube,** for a step-by-step guide to sketching the standard chassis. After that, you can get really creative with the body, add some crazy wings and unique styling features to your car! *Full dimensions can be also found at the back of this guidebook in Appendices i and ii.*

The Design Brief

Your task is to design, make, test and race a miniature F1® racing car made from card, which will race down the STEM Racing 20m elevated racetrack, powered by a compressed air Power Pack. You must use a range of techniques to show design work, including freehand 3D sketches **and** card modelling skills.

Car Design Features:



Your STEM Racing Primary Class car must include the following design features:

- F1® style body including side pods
- Front Wing
- Rear Wing
- Standard STEM Racing wheels, axles, axle bushes and tether line guides

Note: See 'Technical Regulations' (next page) for all body and wing dimensions

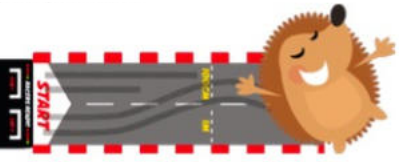
Body Manufacturing:

The car body must be manufactured entirely using the standard F1 car body net supplied by STEM Racing Japan.
To purchase a starter pack, please contact us at **contact@stemracing.jp**

Starter Pack – One (1) set (for 5 cars): JPY 10,000
includes:

- **Chassis**
- **Body Net**
- **Engine House**
- **Wheels**
- **Axles, Bushes, Tetherline Guides**

Driver (optional):



You may add a driver made from any materials.
If included, the driver counts toward the total weight of the car and must be positioned on top of the chassis.
For safety reasons, cutting a hole in the chassis is not permitted.

Technical Regulations:

Technical Regulations dictate how the car must be designed so it is suitable to compete. You'll earn points for passing each regulation, so double check your car is fully legal and ready to race BEFORE you arrive on race day! Here is an explanation of the different types of rules in STEM Racing and what they mean:

Regulation type:	Purpose:	Points:	Extra penalty:
GENERAL	Aesthetics (looks) of the car	20	None
SAFETY	Suitability to race	10	Car may require modification or not race
PERFORMANCE	How fast the car can travel	20	Ineligible for Fastest / Best Eng. Car award

S! **PC1.1 Standard Chassis / Engine Housing - [SAFETY | 10pts]**

Primary Class cars **MUST** use the standard chassis and engine housing, unmodified in any way.

PR1.2 Body construction method - [GENERAL | 20pts]

The car body can be made from a pre-supplied F1 car body net.

S! **PR 1.3 Car Construction Material - [SAFETY | 10pts]**

Primary Class cars MUST use only card to manufacture the car chassis, engine housing, body and wings.

Min: 200g/m2

PR1.4 Overall Body Length - [GENERAL | 5pts]

The total length, measured between the front and rear extremities of the car, including any styling features.

Min: 200mm / Max: 250mm

PR1.5 Graphics - [GENERAL | 5pts]

To make your car easy to identify, some graphic (visual) elements should be clearly displayed on the car.

Mandatory graphics: Logo

P! **PR1.6 Front Wing Span [PERFORMANCE | 20pts]**

The total width of the front and rear wings measured from the widest point across the wing.

Min: 60mm / Max: 80mm

P! **PR1.7 Rear Wing Span [PERFORMANCE | 20pts]**

The total width of the front and rear wings measured from the widest point across the wing.

Min: 60mm / Max: 80mm

P! **PR1.8 Wheels - [PERFORMANCE | 20pts]**

Primary Class cars MUST use the STEM Racing standard wheel, unmodified in any way.

S! **PR1.9 Axles and Axle Bushes - [SAFETY | 10pts]**

Primary Class Cars MUST use two(2) standard axles and six (6) axle bushes, unmodified in any way.

S! **PR1.10 Tether Line Guides - [SAFETY | 10pts]**

Primary Class cars MUST use two (2) standard tether line guides, unmodified in any way, securely attached.

P! **PR1.11 Total Car Weight - [PERFORMANCE | 20pts]**

The minimum weight the complete car must be to race, including wheels, axles, stickers and optional driver.

Min: 40g

THE COMPETITION

How it works - Race Day
How it works - Judging
Judging Scorecards
Next Steps - Entry Class

Race Day - What to Expect

Race Day happens at the National Finals, which brings together all classes of the STEM Racing Japan family. You'll be sharing the track with Development and Professional Class teams, but don't worry – you'll only be competing against other Primary Class participants from your area!

This is your chance to check out the competition and ask the Entry, Development, and Professional Class teams about the next stages of the competition.

Registration & Car Scrutineering

When you arrive you'll register with us, where you'll be given some important information including your judging timetable. Then, you must take your car immediately to our Scrutineering area, where our judges make sure your car will be ready to race. Make sure your car is ready to hand in when you arrive!

Race

You will go head-to-head with another Primary Class participant to compete for the top spot on our leaderboard. Racing will consist of Two(2)timed runs in each lane (four runs in total) of the 20m STEM Racing Japan elevated racetrack.

Judges Debrief & Awards Ceremony

After all the judging has been completed, the team of judges will gather to discuss their scores and work out who will go home from Race Day with our various awards. Awards will be handed out to teams/participants in all classes, including the prestigious **Primary Class Champion** award. Fingers crossed!

- **Primary Class awards**: Fastest Car, Best Engineered Car, Best Reaction Time, Knock-Out Winner
- **Primary Class top prize**: Primary Class Champion

* Award categories may be updated depending on the number of participants and event operations.

The Judges - what they're looking for:

The judges will have a total of 270 points to give you throughout the day and will score your work in two areas: Car Scrutineering and Racing.

Below is a quick guide explaining how the judges score your work, on the next pages are the official Primary Class score cards so you can see exactly what the judges are looking for!

The STEM Racing Japan Primary Class Champion trophy will be awarded with the highest total score, sum of all judging categories (see below). In the case of a tied points score, the participant with the highest racing score will be determined the winner.

Car Scrutieering

Your car will be assessed and hopefully declared safe to race by our judges, who will check your car against the Technical Regulations on Page 10. Car Scrutineering will be scored using the scorecard on page 19.

Total points available for Car Scrutineering : 170 pts

Racing

You will be awarded racing points depending on how you perform on track. Points will be awarded for your reaction time, the time your car takes to complete the track and the combined 'total race time'.

Total points available for Racing : 100 pts

Now have a look at the judging scorecards to see exactly what the judges will be awarding points for when they meet you on Race Day.

Car Scrutineering Scorecard

Team Number:
Team Name:
School:

Specifications					
Regulation	**Summary**	**Criteria**	**Points available**	**Pass/Fail**	**Score**
PR1.1	Chassis / engine housing	Standard items only, unmodified	10		
PR1.2	Body construction	~~**PR1.1.1**: CAD / CAM~~	~~20~~		
		~~**PR1.1.2**: Handmade~~	~~20~~		
		PR1.1.3: Pre-supplied net	20		
PR1.3	Construction material	Card – minimum 200g/m2	10		
PR1.4	Overall body length	Min: 200mm / Max: 250mm	5		
PR1.5	Graphics	Mandatory	5		
PR1.6	Front wing span	Min: 60mm Max: 80mm	20		
PR1.7	Rear wing span	Min: 60mm Max: 80mm	20		
PR1.8	Wheels	Standard wheels	20		
PR1.9	Axles and axle bushes	Standard axles and axle bushes	10		
PR1.10	Tether line guides	Standard guides	10		
PR1.11	Total car weight	Min: 40g	20		
				Specifications Total	**/150**

Aesthetics				
F1® style body	Few recognisable F1® design features	Attempt to create F1® style body with most features present	Highly recognisable F1® style body design, including side pods, front and rear wing and nose cone	
	1 2 3	4 5 6 7	8 9 10	
Quality of Finish and Assembly	Limited quality of finish	Mostly well assembled and engineered	Professional assembly, engineered. Sound techniques	
	1 2 3	4 5 6 7	8 9 10	
			Aesthetics Total	**/20**
			Specifications Total + Aesthetics Total = Car Scrutineering Total =	**/170**

Notes:

STEM RACING™ JAPAN

NEXT STEPS

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Next steps: Entry Class

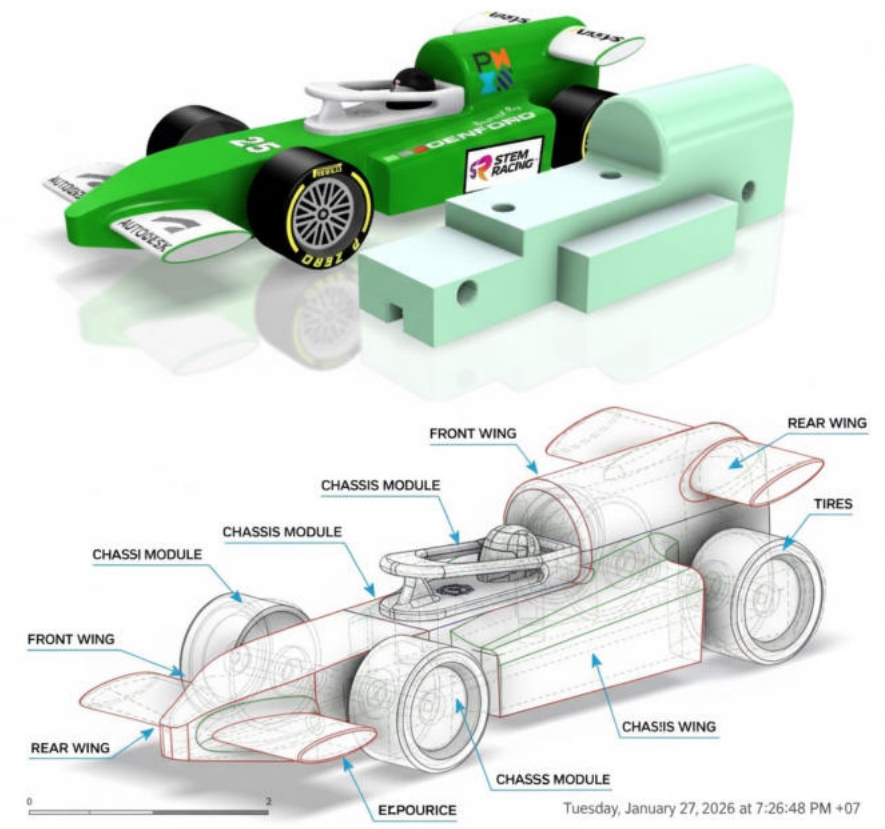
Open to students aged 6–19, the Entry Class follows on from the Primary Class.

The biggest change is that Entry Class is the first step into a more advanced engineering challenge: designing, manufacturing, and racing a miniature Formula-style car made from durable materials.

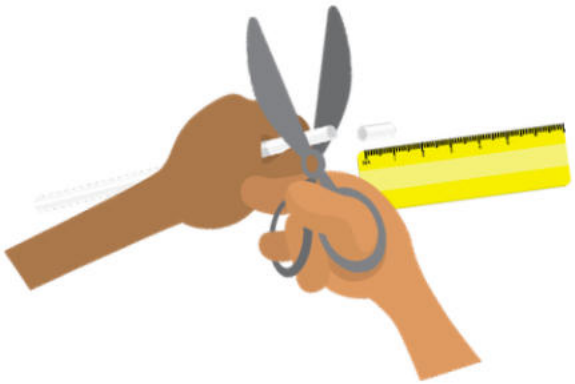
Entry Class also allows participants to compete alongside teams from the Development and Professional Classes. This gives students the opportunity to see more experienced teams in action and learn what it takes to progress to higher levels of STEM Racing.

Entry Class is the perfect next step for those who want to deepen their skills and continue their journey in STEM Racing.

Entry Class is currently open to individual participants.
(Note: Depending on the number of participants and operational requirements, STEM Racing Japan may revise the participation format in future seasons.)



APPENDIX

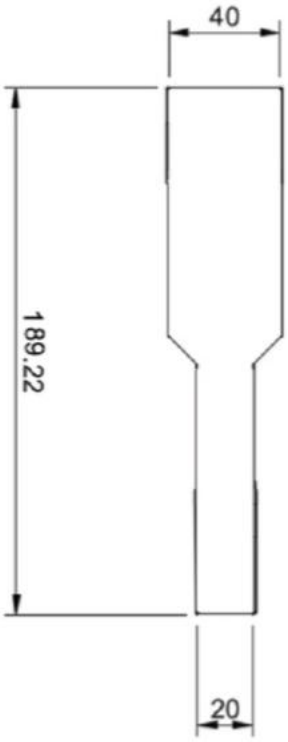


Appendix i. Standard Chassis

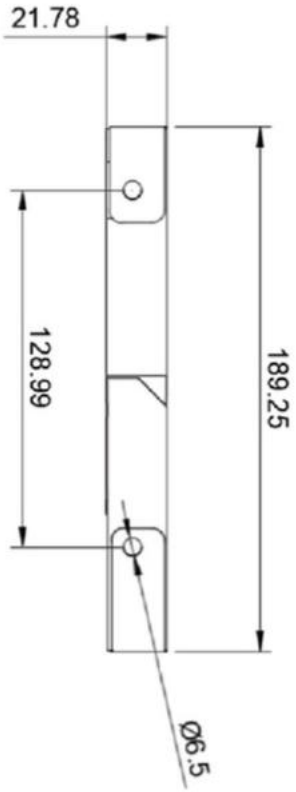
Visit the **STEM Racing UK** YouTube channel, to see how to sketch the standard chassis in 3D, then start designing the body for your racing car. Get your best pencil ready for action!

Orthographic (2D surface) View:

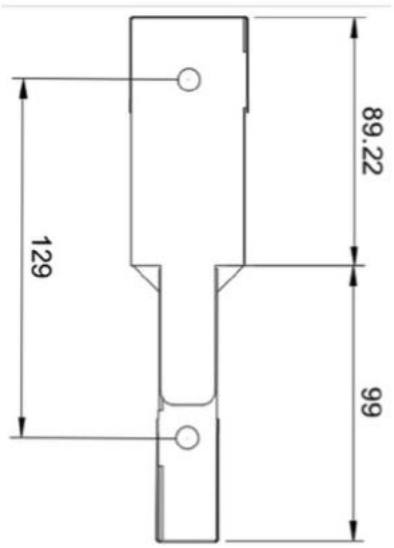
Top View:



Side View:

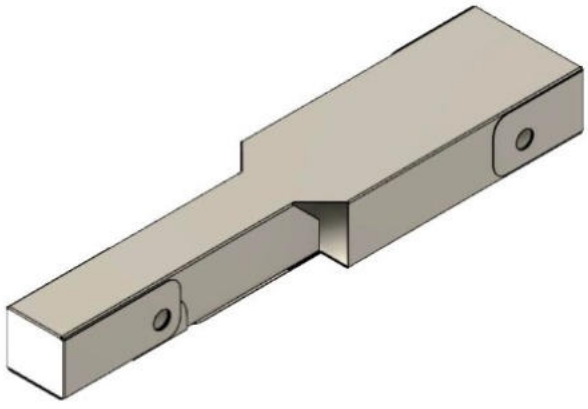


Bottom View:

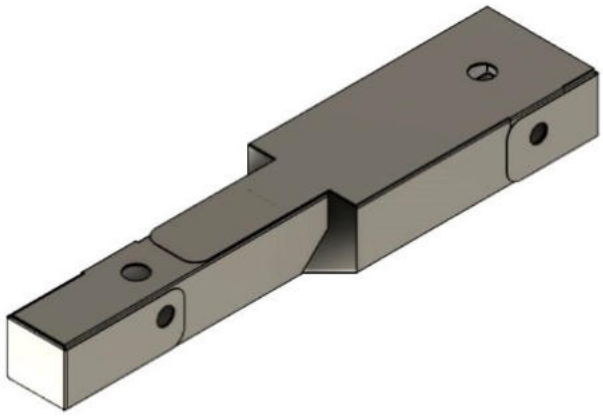


Isometric (3D shape) View:

Top View:



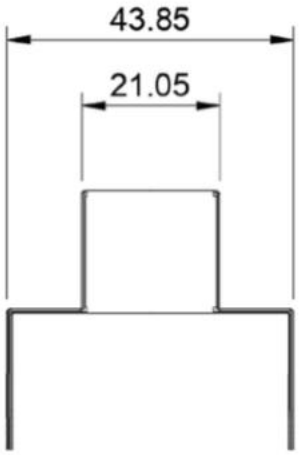
Bottom View:



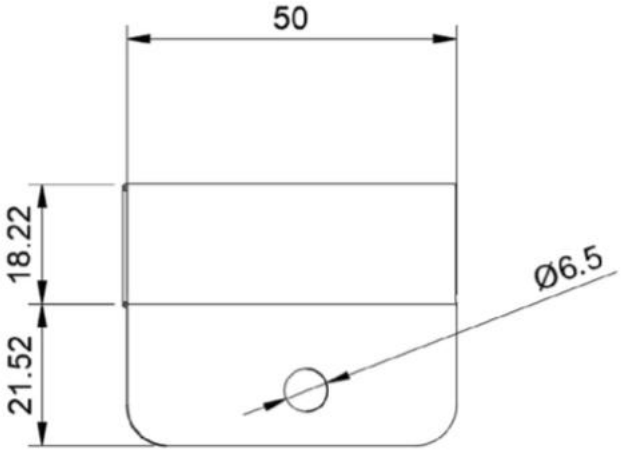
Appendix ii. Standard Engine Housing

Orthographic (2D surface) View:

Front View:

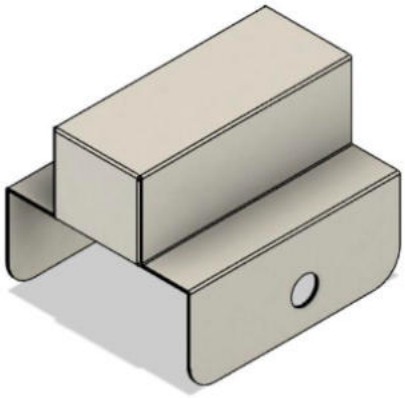


Side View:

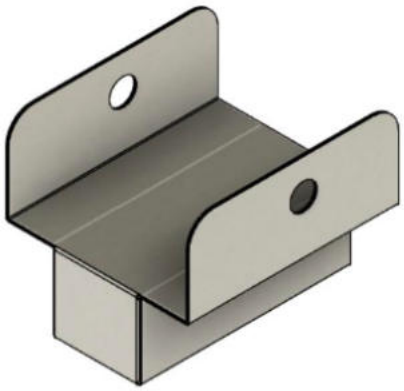


Isometric (3D) View:

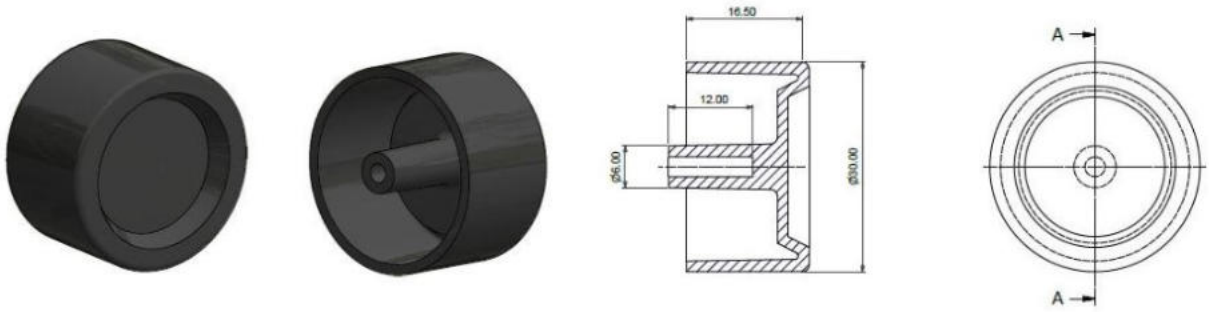
Top View:



Bottom View:

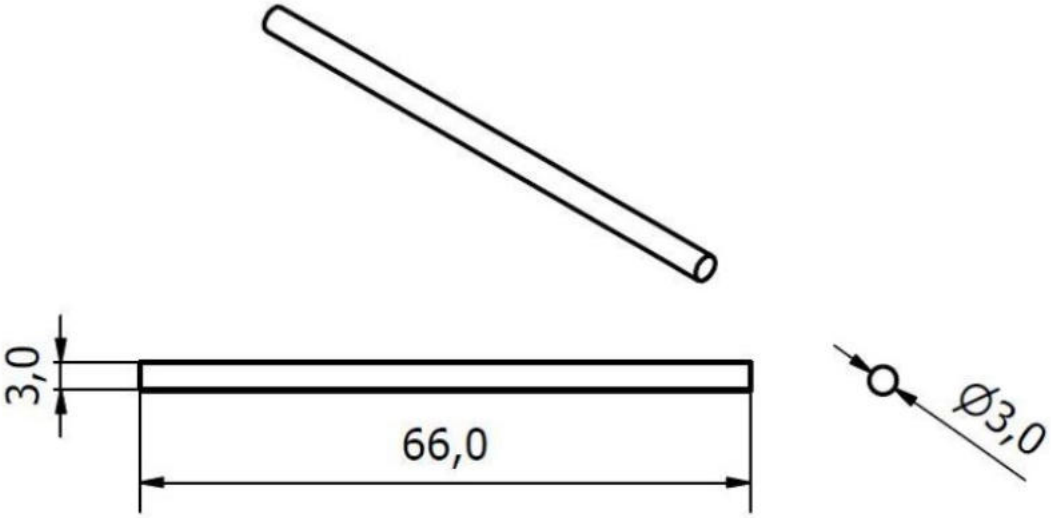


Appendix iii. STEM Racing Standard Wheel



Individual wheel weight: 3.5-3.8g

Appendix iv. Standard Axle

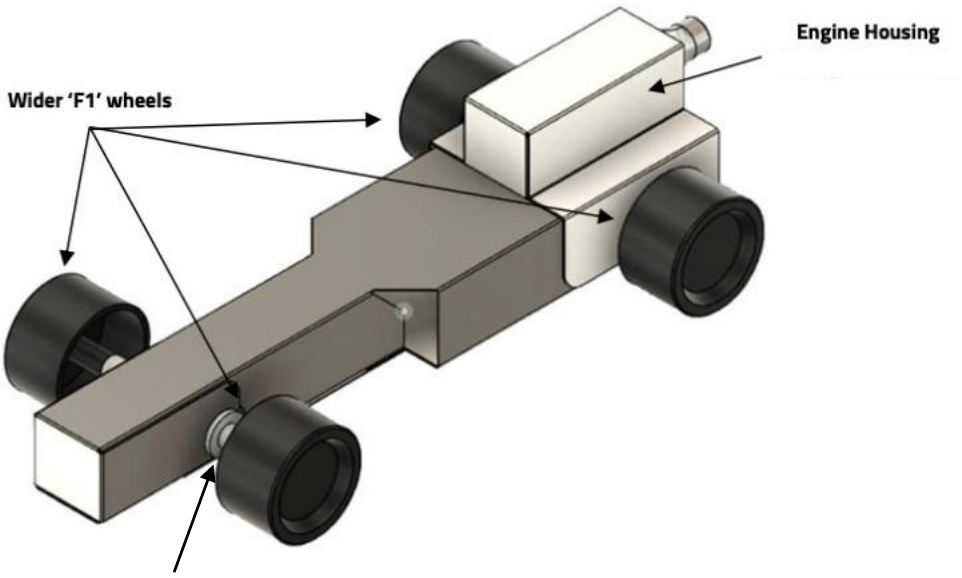


Individual axle weight: 4.0g

Appendix v. Ready to Race Checklist

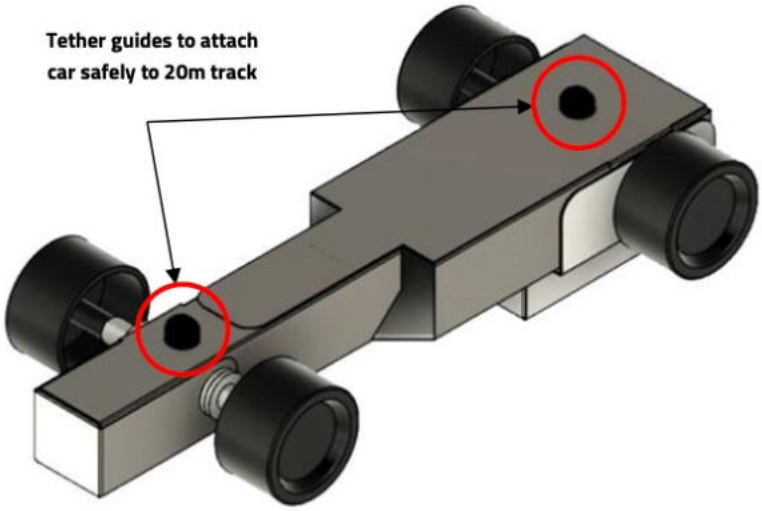
Your car must be presented in a 'Ready-to-Race' state on competition day, which means it will be safe to attach to and race on the official 20m elevated racetrack. The diagram below shows the important features required for your car to race. If you have built your cars for the Denford Primary STEM Project, the components below are included in the 'Ready-to-Race Pack'.

Top Isometric (3D) View:



Use two(2) axle bushes per front wheel.
Join flanged ends together before wheel fitting.

Bottom Isometric (3D) View:



Good Luck, See You on Race Day!

If you have any questions, please do not hesitate to contact us!

contact@stemracing.jp

www.stemracing.jp