

SUSTAINABILITY

SOAR blueprints

COURSE

COURSE OVERVIEW

This course teaches STEM Racing teams how to build sustainability into every part of their project — not as a single portfolio page, but as a lens across engineering, enterprise, and project management. Across 8 modules, teams will learn to identify their real environmental and social footprint, take action that fits their actual resources, prove that action with evidence, and avoid the trap of claims they can't back up.

Two tools run through the whole course and get used again and again, not just once:

- The Carbon Footprint Calculator — built for STEM Racing activities (travel, manufacturing, events)
- The Sustainability Ethics Checklist — for testing whether a claim, material choice, or sponsor decision is genuinely sustainable or just sounds good

Course learning outcomes: By the end, teams will:

- Understand what sustainability means in STEM Racing beyond the scorecard
- Identify where their decisions actually create impact
- Choose sustainability actions realistic for their team's resources and location
- Build sustainability into design and planning from day one, not at the end
- Measure impact with real, honest evidence
- Spot and avoid greenwashing in their own claims
- Communicate sustainability clearly to judges, sponsors, and their school
- Leave behind a sustainability plan the next team can build on



MEET YOUR TWO TOOLS

Purpose: These aren't one-off worksheets — you'll use both repeatedly across this course and your season.

Carbon Footprint Calculator

- Estimates emissions from your team's travel, manufacturing, and events
- Use it before a decision (to compare options) and after (to prove impact)

Sustainability Ethics Checklist

- A quick test for any claim, material, or sponsor decision: is this genuinely sustainable, or does it just sound good?
- Use it to screen shortlists, self-audit claims before submission, and vet sponsors

Check these out on our website or on this link: <https://soar-greengrid.vercel.app/>



MODULE 1: WHAT DOES SUSTAINABILITY MEAN IN STEM RACING?

Purpose:

Sustainability isn't one page of your portfolio — it's a lens that applies to every engineering, enterprise, and project management decision your team makes. Judges are trained to spot sustainability that was bolted on at the end.

The Three Pillars

- **Environmental** — emissions, materials, waste
- **Social** — accessibility, inclusion, community impact, outreach
- **Economic** — cost efficiency, sponsor value, long-term viability This is called Triple Bottom Line thinking — all three matter, not just the environmental one.

Why This Matters for Your Team Specifically

- You travel internationally to competitions
- You manufacture physical products
- You run public-facing events and outreach All three have a real footprint — this isn't theoretical for a STEM Racing team.

The Two Traps to Avoid

- Treating sustainability as a checkbox done at the end to satisfy the Enterprise scorecard
- "Sustainability for marks" vs. "sustainability as good practice that also earns marks" — judges can tell the difference



MODULE 2: DECISION MAPPING

Purpose:

Sustainability impact is created (or avoided) at dozens of small decision points across a season — most of which don't look like "sustainability decisions" on the surface until you name them.

Step 1: Map your decision categories:

Materials

- Manufacturing process choice (e.g. MJF vs. SLS)
- Material sourcing
- Reusing prototypes/offcuts between seasons

Manufacturing

- Energy use
- Waste generated
- Number of design iterations required

Transport

- Team travel to events, flights to World Finals
- Local commuting for workshops and outreach

Events

- Pit display materials
- Marketing materials (printing, banners)
- Waste generated at physical events

Budgeting

- How spending choices ripple into environmental/social outcomes
- e.g. redirecting saved costs into offsetting

Outreach

- Choosing accessible, low-cost, low-footprint ways to reach schools and community groups

Step 2: Activity — Run a Decision Audit

1. List 10 real decisions your team has already made this season
2. Run each through the Carbon Footprint Calculator
3. Rank them by footprint size

Most teams are surprised: transport usually dominates, not manufacturing.

Tool Connection: The Carbon Footprint Calculator is the engine of this audit — it turns a vague "we should be more sustainable" into a ranked list of what actually matters.



MODULE 3: CHOOSING ACTIONS FOR YOUR TEAM

Purpose:

Not every team has the same budget, location, or access to partners. Sustainability action should be judged on effort and appropriateness — not scale. A small, local action done well beats an impressive-sounding action you can't actually deliver.

Step 1: Audit What You Actually Have

- School facilities
- Local partners
- Existing sponsor relationships
- Team skills

Step 2: Match Action to Context

- Local context changes the right answer — a team in a city with poor public transport needs a different transport strategy than a team in a city with strong transit. Neither is "less sustainable" for choosing what's actually available to them.
- Step 3: Screen Your Shortlist With the Ethics Checklist Before committing to an action, ask:
 - Can we actually execute this within our season's timeline?
 - Can we evidence it honestly, or are we guessing?
 - Is this the most impressive-sounding option, or the most deliverable one?

Tool Connection: Use the Ethics Checklist here to self-screen your shortlist — feasibility and honesty first, impressiveness second.



MODULE 4: BUILDING SUSTAINABILITY IN FROM THE START

Purpose: Sustainability should shape decisions at the design stage — not get retrofitted onto a finished project. This is the single biggest differentiator between a portfolio that reads as genuinely integrated vs. one that reads as "engineering happened, then we added a sustainability page." It's also exactly what the top scoring band means by "effective implementation" and "active involvement."

Step 1: Dual-Purpose Decisions — choices that serve two goals at once:

Engineering

- Material selection and drag reduction can serve performance and sustainability at once
- FEA/virtual testing reduces both cost and material waste

Enterprise

- Screen sponsors and suppliers for their own sustainability practices
- Design pit displays from recyclable materials

Project Management

- Set sustainability KPIs alongside cost and schedule KPIs — from project initiation, not week 10
- Assign ownership early (a named sustainability lead, not "everyone's responsibility")

Step 2: Activity

Before finalising your next manufacturing or travel plan, estimate its footprint with the calculator first — so it influences the decision instead of just measuring it afterward.

Tool Connection: The Carbon Footprint Calculator moves from a reporting tool to a design-stage tool here.



MODULE 5: MEASURING IMPACT WITH REAL EVIDENCE

Purpose: Claims without numbers don't convince judges — or anyone. This is the most common gap in student portfolios: strong narrative, no evidence.

Step 1: Simple Metrics You Can Actually Collect

- Headcounts
- Before/after surveys
- Cost comparisons
- Weight/volume of materials reused
- CO₂ estimates from the calculator

Step 2: Output vs. Outcome

- Output: "We ran an event"
- Outcome: "40 students attended and 60% reported increased interest in STEM" Judges look for outcomes, not outputs.

Step 3: Set a Baseline First You can't show "impact" without a before. Measure before you start, then measure after.

Example of the statistic you're aiming for: "We switched from flights to a coach for our regional competition and reduced our travel emissions by 34%, verified using our Carbon Footprint Calculator." That's specific, measurable, and honest — compare it to "we tried to travel more sustainably."



MODULE 6: AVOIDING GREENWASHING

Purpose: A vague or exaggerated sustainability claim is worse than no claim at all — it undermines credibility, and in a judged competition it can be flagged as an integrity issue.

Step 1: What Greenwashing Looks Like

Greenwashing version:

"We're carbon neutral!"

"Our pit display is eco-friendly"

"We're a green team"

Honest version:

"We calculated our emissions at X, offset them via Y, verified by Z"

"Our pit display uses 80% recycled cardboard, saving an estimated X kg of material waste"

(no number, no method — this is a red flag on its own)

Step 2: The Judge Test Before you write any sustainability claim, ask yourself:

"Could I explain exactly how I know this number is true if a judge asked me right now?"

If the answer is no, don't write the claim yet — go find the number.

Step 3: Activity — Stress-Test Your Claims

Take 2–3 real or draft claims from your own portfolio and run them through the Ethics Checklist:

- Is there a specific number attached?
- Can we explain the method behind that number?
- Would this survive a judge's follow-up question?
- Are we overstating a small action to sound bigger than it is?



MODULE 7: COMMUNICATING SUSTAINABILITY TO EVERY AUDIENCE

Purpose: Good sustainability work still needs to be communicated well. A judge, a sponsor, and a Year 7 student at an outreach event need the same underlying facts — presented completely differently. Don't default to one register for every audience.

Step 1: Adapt Register and Depth

Audience vs What they want

Judges

- Evidence-dense, KPI-driven, precise

Sponsors

- ROI and brand-alignment framing

School community

- Accessible, story-led, visual

Step 2: Structure the Narrative

- Problem → Action → Evidence → What's Next Show setbacks honestly rather than hiding them — adaptation is a stronger signal to judges than a story with no friction in it.

Step 3: Activity

Take one real result (e.g. a footprint reduction from your calculator) and draft it three ways:

- A portfolio paragraph (for judges)
- A one-line sponsor update (for sponsors)
- A one-slide school assembly summary (for your community)



MODULE 8: BUILDING A LEGACY THAT OUTLASTS THIS SEASON

Purpose: Sustainability work that dies with the current season's team is weaker than sustainability infrastructure that compounds year over year. This is what separates "good implementation" from "effective implementation" in scoring language.

Step 1: What a Legacy Handoff Looks Like

- Written documentation of what you tried
- Retained tools (the calculator, the checklist, or your adapted versions)
- Retained physical resources (reusable materials, equipment)

Step 2: What's Worth Passing On

- Which initiatives worked, and why
- Which didn't, and why not
- Next season's starting point should be better than this season's — not a restart from zero

Step 3: Activity — Build Your Handoff Note Package the following for next season's team:

- The Carbon Footprint Calculator (or your adapted version)
- The Ethics Checklist (or your adapted version)
- A short "what worked / what didn't" summary
- Your key before/after metrics from this season



ASSESSMENT: IS YOUR SUSTAINABILITY PLAN READY?

Understanding & Scoping

- We can explain sustainability as a lens across engineering, enterprise, and PM — not just a portfolio section
- We've mapped our real decision points (materials, manufacturing, transport, events, budgeting, outreach)
- We've matched our actions to our actual resources, timeline, and location

Integration & Measurement

- Sustainability KPIs are set alongside cost/schedule KPIs, with an owner assigned
- We have before/after metrics, not just outputs
- Every claim in our portfolio has a specific number and a method behind it

Communication & Legacy

- We have versions of our sustainability story adapted for judges, sponsors, and our school community
- We've documented what worked and what didn't this season
- Our handoff note (tools + summary + metrics) is ready for next season's team

