

# TEN80 STUDENT RACING CHALLENGE



THE MORE YOU KNOW . . . THE FASTER YOU GO.

## The Storyline & Challenge

Students own a motorsports business and their ultimate goal is to engineer performance. This includes personal performance, team performance and of course, race performance. Students apply core physics concepts, math modeling and the appropriate technology to engineer solutions to problems that parallel those encountered by professional teams.

## Standards Alignments

All programs align to the Common Core State Standards for Mathematics and English Language Arts and Next Generation Science Standards (NGSS). The Student Racing Challenge also aligns to International Technology and Engineering Educators Association (ITEEA) Standards for Technological Literacy.

## Available Formats

- CLASS: Individual student accounts
- CLUB: Team accounts
- CAMP: 30 contact hours, computer access not required

## Technology

The base technology is a fully operational 1:10 scale electric radio-controlled (RC) car that can be setup in over 14 million ways before re-engineering a single part. Optional technology for specialization projects includes 3D-CAD, rapid prototyping tools, physical computing with microprocessors and sensors. SolidWorks 3D CAD software is free to Ten80 students.

## Curriculum Overview

The Student Racing Challenge (SRC) car arrives fully operational. Through the early units students reverse engineer the electromechanical systems, following Good Investigation Practices (GIP). The Problem-Solving unit introduces the power of math modeling in making data-driven decisions then those lessons learned are applied to optimize the car's performance and ultimately redesign the car.

Enterprise & Innovation units motivate students to manage their time and resources, to market themselves and to develop 21st Century Skills like leadership that are required to turn ideas into realities.

## Competition Overview (Optional)

Student Racing Challenge teams compete in locally run races and are invited to compete in the National STEM League (NSL) through Face-to-Face (F2F) Competitions and the Online Points Race. Points leaders and F2F competition winners are invited to the NSL Finals.

### Get Involved

Ten80Education.com  
Toll free 855.836.8033  
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Option to Collaborate  
& Compete in the NSL



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# STUDENT RACING CHALLENGE CLASS FORMAT

## Curriculum

Contact us to learn how others in your state or district are assigning science credit, CTE and/or STEM Endorsements.

Click-through lessons direct students' physical activity and analysis. Engineering logbooks are fundamental to the learning experience. Educators assess students with a mix of online quizzes and rubric-based evaluation of documentation, results and physical products.

Over the first semester, students engage in three aspects of race engineering, with key focus lessons to dive into key concepts such as energy, electricity and laws of motion:

1. Problem-Solving (& Math Modeling)
2. Driving through Data
3. Mechanical Systems (& Science Behind Them)

Students also manage and think about marketing themselves through Enterprise & Innovation activities.

Once students master the fundamentals in semester 1, they specialize into areas of personal interest. Included Projects are:

- Chassis Setup Investigations, the "Race Team" pathway
- Aerodynamic Design using 3-D CAD
- Robo RaCeCar (additional materials required)

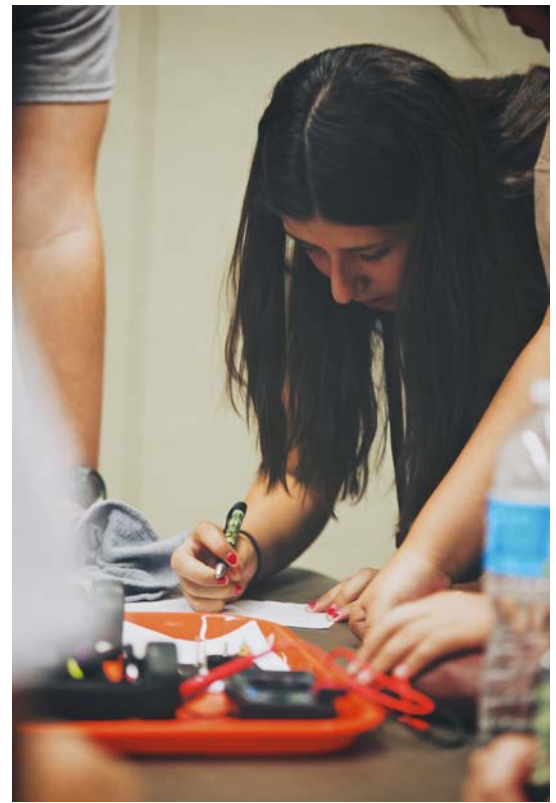
SolidWorks® is a 3D CAD program that is FREE to all students involved in Ten80 programs; however, you can use any 3D CAD software.

## Materials Kit

CLASS kits include all materials required to complete the curriculum. Tools and technology are non-consumable so with care, they can be used year-after-year.

- Booster Kits (contents on following page)
- Carbon Fiber Chassis
- Calipers, soldering stations, weigh scales
- Spare rechargeable car batteries
- Geometry Setup Station with ride height gauges
- Data Acquisition System
- Focus Lesson sets
- Spare Parts Pack

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Race Engineering Certifications (STEM1-A)				
STEM-1A Modules at a Glance				
<small>* Implementation Guide is a separate table which provides the resources for each unit, challenge and activity.</small>				
Unit	Challenge	Duration	Essential Questions, Skills/ Knowledge, Understandings	Standards (NGSS, CC)
1. Pre-Qualifying	01. Intro & RC Relay Race	2 sessions	<ul style="list-style-type: none"> <li>What does it take to make a team-oriented goal?</li> <li>What is the value of using good investigation practices (GIP) including using data to improve performance?</li> </ul>	Download the full alignment table
	02. Stripack Your Toolbox (Pre-Assessment)	2 sessions	<ul style="list-style-type: none"> <li>How do units relate to one another?</li> <li>How can graphs and plots be used to represent data?</li> </ul>	
2. Team Building	01. Team Charter	2 sessions	<ul style="list-style-type: none"> <li>What are our goals as team members and as a team?</li> </ul>	Download the full alignment table

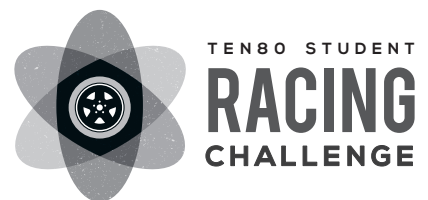
## Racing CLASS Startup Options

Club kits provide 1 curriculum login per team.

Should teams choose to participate in the National STEM League (NSL) the number of eligible teams is equal to the number of cars in their base kit.

License renewal required in years after initial startup. See order forms for details.

CLASS	Educator Licenses	Student Licenses	NSL Teams	Kit
Home	2	5	1	1-Station
Small	2	10	2	2-Stations
Medium	2	16	4	4-Stations
Full	2	24	6	6-Stations



# CUSTOMIZE YOUR CLUB

## Modular Design

The Student Racing Challenge curriculum is modular. During the Foundations Training, you'll arrange these self-contained modules into a program that works for your unique set of goals, population and resources.

### Race Engineering

- Problem-Solving
- Driving-through-Data
- Mechanical Systems

### Middle Grades Guide

(10 week starter)

### Library of Focus Lessons

### Specialization Pathways

- Enterprise & Innovation
- Chassis Setup Investigations
- Aerodynamic Design, 3-D CAD
- Data-Driven Design projects
- Renewable Energy Racing
- Robotic RaCeCar

## CLUB Kits

Start with non-consumable 1, 2, 4 or 6-Car Base Kit. Add materials with 1-Car Booster Kits. Each 1-Car station serves up to four students with a very hands-on experience or 10 students who divide & conquer the various aspects of operating a team. Team roles can include graphic or web design, fabrication, marketing, project management, engineering R&D, community outreach, etc.

All base kits provide student access to the SolidWorks® Student Edition and web consultation to help organize your program.

### 1, 2 or 4-Car Base Kit Contents

- 1, 2 or 4 × Booster Kits (contents shown below)
- 1, 2 or 4 Carbon Fiber Chassis
- 1 or 2 × Caliper, soldering station & weigh scale
- 1 × Ride Height Gauge

### 6-Car Base Kit

- 6 × Booster Kits (contents shown below)
- 6 × Carbon Fiber Chassis
- 3 × Calipers, soldering stations, weigh scales
- 3 × Ride Height Gauges
- 3 × Additional Rechargeable 7.2V car batteries
- 1 × Spare Parts Pack

### 1-Car Booster Kit

- 1 × Competition RC car (1:10 scale)
- 1 × Small RC car (1:18 scale) for classroom investigations
- 1 × Set of measurement tools
- 2 × Rechargeable car batteries with 1 Smart battery charger
- 1 × Extra set of 4 wheels with tires
- 2 × Extra gears
- 1 × Clear car body
- Misc. spare parts



## Racing CLUB Startup Options

Club kits provide 1 curriculum login per team.

Should teams choose to participate in the National STEM League (NSL) the number of eligible teams is equal to the number of cars in their base kit.

CLUB Base Kit	Educator Licenses	Team Licenses	NSL Teams
1-Car	2	1	1
2-Car	2	2	2
4-Car	2	4	4
6-Car	2	6	6

Enhance your program with additional materials and technology outlined on the following page.



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# SUMMER RACING CAMP

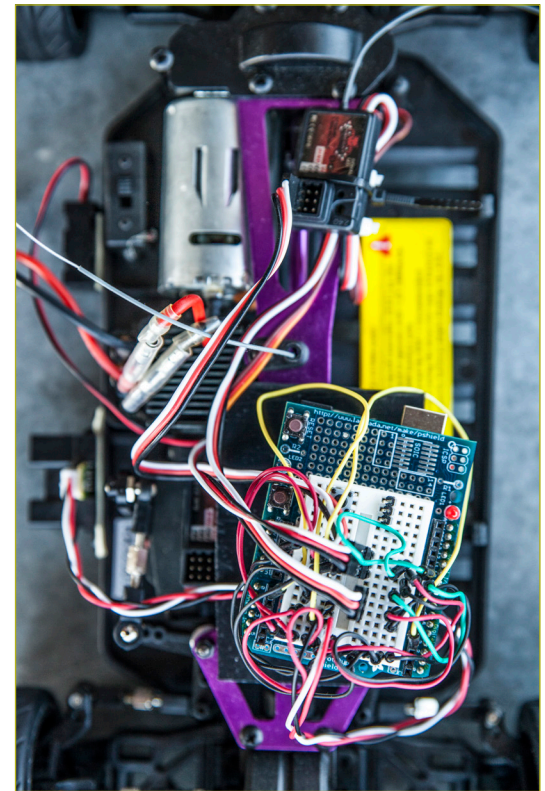
This camp-specific curriculum is organized into a 5-day format with 25-40 contact hours depending on your program organization.

The 6-Car CAMP kit includes materials and print pack for six teams which is 18-30 students. Curriculum is appropriate for middle or high school students. Middle grade students spend more time on Problem-Solving Challenges using the small 1:18 scale cars while more advanced students spend more time optimizing performance of the 1:10 scale cars.

The materials are NOT consumable and can be used to run multiple camps.

- 6 × Booster Kits (contents shown below)
- 6 × Carbon Fiber Chassis
- 3 × Caliper, soldering station, weigh scale & ride height gauges
- 3 × Additional Rechargeable 7.2V car batteries
- 1 × Spare Parts Pack
- Online CAMP Curriculum with downloadable facilitator's guide, downloadable team activity guide (logbook), videos and presentations

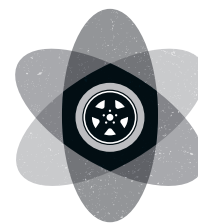
After the first camp, a per student license fee is required to maintain license and access to curriculum, resources and training.



## ADDITIONAL MATERIALS & TECH

See the order forms and online store for additional options and info.

- Replacement Cars (Sets of 2, 4 or 6)
- Replacement Carbon-Fiber Chassis (Sets of 2, 4 or 6)
- Energy Pack (2 x 7.2V RC car batteries)
- Power Pack (Battery Bundle + Smart Charger)
- Wheel Pack (2 sets of replacement wheels)
- Clear 1:10 Scale Car Body
- Spare Parts Pack for one car (SRC-001 car)
- Gear Set (2 spur & 2 pinion for SRC-001 car)
- Hop-Up Kit for one car: Aluminum parts/Carbon Fiber Chassis
- Hop-Up kit for one car: All Aluminum Upgrade
- Robo RaCecar - automate your car with Arduino kit
- Chassis Geometry Setup System
- Data Acquisition System
- Spare/Replacement ESC (2 brand options)
- Spare/Replacement Servos (2 brand options)
- LED Show Focus Lesson, 3-Set
- Make a Motor Focus Lesson, 3-Set
- Track Rail & Transponder Systems



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