

# 2011-12 Catalog



**NASCAR** STEM Initiative



## Who is on a Team?

Though STEM mentors are highly suggested for all teams, anyone can form a team whether or not they have a background in STEM. A team can be formed by any school, class, after-school program, extracurricular group, home school, neighborhood group, club, or civic organization.

An organization can enter one or up to six teams in the Ten80 Student Racing Challenge. Successful teams usually consist of between 4 - 10 students in grades 7 - 12 and at least one adult coach. An adult can coach multiple teams, but a child can be on only one team. Teams can include these roles:

- Team manager
- Race Engineers, Math and Physics 'Experts'
- Driver and Chief technician
- Machinists / Fabricators
- Web Design & Video Editing
- Graphic Designer
- Marketing & Public Relations Director
- Programmer
- Chief Financial Officer & Fund-raiser

## Getting Started in Year 1

### Base & Booster Kits

Get started by purchasing the Base Kit that includes 2-car stations, curriculum, web consultation and entries for up to two teams from one organization in the 2011-12 STEM League. Add Booster Kits to enter more teams and engage more students.

### Turn-Key Camp Kits

If you are starting your program with a summer camp or need materials for a full classroom, you may consider a six-station turn-key camp kit. It includes 6 booster kits, camp curriculum, spare parts packs, wheel kits and spare batteries. It does not however include registration for the 2011-12 STEM League. To enter the league, register teams as outlined below.

### Additional Materials & Technology

Teams can seek sponsors for materials, travel, training and for optional additional materials. Additional materials can include spare parts, replacement parts or upgrade parts. Technology options include data acquisition systems and chassis geometry setup boards. Teams can also compete in the P.I.T. Now! Alternative Energy Challenge using the fuel cell or solar energy kits.

## Years 2, 3, 4.....

The kit is NOT consumable so teams only have to pay the annual league entry fee of \$550 (2011-12 price) for the first team and \$150 for each additional team. Teams reuse the base kit each year, replacing only missing or broken parts and adding technology to expand team capabilities. See the optional parts list for details.

# Base & Booster Kits



NASCAR STEM Initiative

Begin with a non-consumable 2-car base kit. Add materials and league entries with 1-car booster kits.

Success in the Ten80 Student Racing Challenge: NASCAR STEM Initiative™ does not depend on the car you use; however, you do have choices. If you are new to the Student Racing Challenge, we recommend the SRC-001 car. If you have the original Ten80 Car, SRC-901, and want to continue with only one car version, this model is compatible to the SRC-001 car for league competitions but is a bit higher priced. All camp kits, fuel cell and robotics projects use the SRC-001 car. For help in choosing, call our team at 855-836-8033.

## Kit Contents

Base Kits provide curriculum and materials and team entries for two teams. Booster kits provide materials and entry for one additional team.

Base Kit Includes:

- 2 x 1:10 Scale RC cars, controllers and storage bins
- 2 x rechargeable batteries and 2 x smart battery chargers
- 2 x Stopwatches, 2 x tape measures
- Basic tool kit
- 8 x replacement gears and other misc. spare parts
- SolidWorks® Student Edition (1-year)
- 2 x entries into the 2011-12 STEM League
- Print Curriculum for middle or high school
- Login to access web resources for middle and high school students
- Web consultation to help organize your program



Booster Kit Includes:

- 1 x 1:10 Scale RC cars, controllers and storage bin
- 1 x rechargeable batteries and smart battery chargers
- 1 x Stopwatch and tape measures
- Basic tool kit
- 4 x Extra gear sets and other misc. spare parts
- 1 x entry into the 2011-12 STEM League

Item	Product #	Price
2-Car Base Kit for High School	SRC-001	\$2,296
2-Car Base Kit for Middle School	SRC-MS-001	\$2,296
1-Car Booster Kit for High School	SRC-002	\$648
1-Car Booster Kit for Middle School	SRC-MS-002	\$648
Spare Parts Pack for one car	SRC-008	\$98
Aluminum Upgrade (Shock&Control Arm)	SRC-007B or P	\$59
Gear Set (2 spur & 4 pinion)	SRC-005	\$39
Replacement Car	SRC-006	Contact Us

\* See order form for SRC-901 options

## SRC-001 Car -Recommended!

*Designed by Ten80's Engineers for top performance in the Student Racing Challenge*



- Higher acceleration with 27T motor-ESC combo
- Offset wheel base adds stability in turns
- Light but with protection for gears and other components; fewer repairs required
- Drive shaft instead of drive belt demonstrates how full scale cars work and requires fewer repairs
- Used for Ten80's robot and fuel cell projects
- Lower top speed with motor-ESC combo

## SRC-901 Car

*The original competition car is still available.*



- Higher top speed, but lower acceleration with 20T motor-ESC combo
- Light with the lowest center of gravity
- Lower friction with bearings instead of bushings
- Exposed gears allow for a faster gear change but also more repairs
- Higher cost
- Spares not always available

# Turn-Key Camp Kits



To meet your students' needs, Ten80's engineer-educators offer five different camps. Contact our team to discuss your unique set of needs, resources and to build the program that's right for you.

Ten80's Camp Curriculum outlines the detailed agenda and content for a five-day camp with optional extensions. The materials kits serve as the base kit upon which you can build a formal, long-term and evolving program in your science, technology, engineering and math (STEM) classrooms. Training takes place over the internet in up to five, one-hour sessions and is also available face-to-face.

Camp	Hybrid	Race Engineering	Race Engineering with Wings	Fabricate Performance	P.I.T. Now (Alt. Energy)
<b>Grades (rising)</b>	7 - 9 grades	8 - 12 grades	9 - 12 grades	9 - 12 grades	9 - 12 grades
<b>Required Technology<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• Computer lab</li> <li>• Spreadsheets</li> <li>• Projection system</li> <li>• Hand tools</li> </ul>	<ul style="list-style-type: none"> <li>• Computer lab</li> <li>• Spreadsheets</li> <li>• Projection system</li> <li>• Hand tools</li> </ul>	<ul style="list-style-type: none"> <li>• Computer lab</li> <li>• Spreadsheets</li> <li>• Projection system</li> <li>• Hand tools</li> </ul>	<ul style="list-style-type: none"> <li>• Computer lab</li> <li>• Projection system</li> <li>• Machine Shop (drill press, CNC, 3D printer, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Computer lab</li> <li>• Spreadsheets</li> <li>• Projection system</li> <li>• Charge Station Camp Kit</li> </ul>
<b>Curriculum &amp; Kit Cost (Year 1)</b>	\$ 5,997	\$ 5,997	\$ 5,997	\$ 5,997	\$ 5,997 + Charge Station (Add'l Mat's)
<b>Web Training</b>	Included Year 1	Included Year 1	Included Year 1	Included Year 1	Included Year 1
<b>Additional Material Costs<sup>2</sup></b>	\$40	\$ 40	\$200 - \$300 (wing materials)	\$ 500 (fabrication materials)	\$ 500 - \$ 3,300
<b>New Curriculum &amp; License, Year 2+</b>	\$25 / participant	\$25 / participant	\$25 / participant	\$25 / participant	\$25 / participant
<b>Suggested Personnel</b>	1 lead, 1 assistant, 1 helper	1 lead, 1 assistant, 1 helper	1 lead, 1 assistant, 1 helper, SolidWorks expert	1 lead, 1 assistant, and shop pro's	1 lead, 1 assistant, 1 - 2 helpers

**Hybrid Camp for Middle Schools & Rising 9th Grades:** This camp uses both the simple 'small cars' of Math2Go and the high-tech 'big cars' from the Ten80 Student Racing Challenge: NASCAR STEM Initiative. Math2Go Challenges are solved with data that reveals clear patterns when modeled mathematically. Students then tackle more complicated scenarios in the Ten80 Student Racing Challenge: NASCAR STEM Initiative. Hybrid kit includes six 'small car stations' and 'big car' stations.

**Race Engineering:** Improve race performance through mathematical modeling, physics and 3D CAD Analysis. Choose the best gears, chassis geometry, map the ideal drive path around a curve and (just like the car companies do) use a skid pad and Newton's Laws of Motion to find the coefficient of friction.

**Race Engineering with Wings:** Improve race performance through mathematical modeling, physics and 3D CAD Analysis. Spend a little less time on choosing the best gears and wheels and more time learning about aerodynamics and fabricating a car wing to add downforce that improves handling on turns.

**Machine Shop:** Analyze and improve aerodynamic performance, maximize strength and minimize weight of the Ten80 Student Racing Challenge car using SolidWorks and advanced manufacturing techniques to fabricate parts for the car.

**P.I.T. Now (Petroleum Independent Transportation NOW!):** Examine how the resources in your own community can serve to power the Ten80 Student Racing Challenge electric cars then build a charging station to get 'off the grid'.

<sup>1</sup> Graphing Calculators are optional in all camps. SolidWorks must be installed on network.

<sup>2</sup> Costs include materials you supply.

Estimated camp costs do not include facilities, overhead, personnel, food and prizes

<sup>3</sup> SolidWorks is a leading, intuitive 3D design program that includes a Flow Simulator that students use as a 'Virtual Wind Tunnel'.

# Additional Materials & Technology



Since Ten80's kits are not consumable, instead of starting over each year, you can enhance your kit and upgrade technology.

Additional available technology includes data acquisition systems and chassis setup boards (see below).

Regions and schools hosting competitions can benefit from the competition pack which includes the transponder system and track rail system.

Item	Product #	Price
Energy Pack (2 batteries)	SRC-06	\$96
Wheel Pack (2 sets of replacement wheels)	SRC-07	\$98
Clear 1:10 Scale Car Body	SRC-09	\$35
Spare Parts Pack for one car (SRC-001 car)	SRC-008	\$98
Gear Set (2 spur & 4 pinion for SRC-001 car)	SRC-005	\$39
Aluminum Upgrades (Shocks & Control Arms SRC-001 Car, Blue or Purple)	SRC-007B or P	\$70
Chassis Geometry Setup Board	SRC-15	\$220
Data Acquisition System	SRC-16	\$190
Transponder System for up to 10 cars with web training	SRC-RGN-01	\$2,400
Track rail system	SRC-RGN-02	\$2,400

\* See order form for SRC-901 options



Data acquisition system for each car to electronically gather data on torque, steering, acceleration, etc.



Use the chassis geometry setup board to accurately measure and set tire angles.



Wheel packs provide a set of rubber tires and a set of foam tires.



Energy packs provide two additional high capacity batteries.

## Support & League Registration

Ten80's team of engineers and educators are here to provide support. Your kit is reusable in years two and beyond. To gain access to new curriculum and compete in the National STEM League each year, only a league registration fee is required.

Item	Product #	Price
Year 2+, Annual Registration Fee for 1st team	SRC-51	\$550
Year 2+, Annual Registration Fee for each additional team	SRC-52	\$150
Training: Online Coaching (\$10/wk, 20 weeks)	SRC-PD0	\$200
Training: One-day Training at Your Facility	SRC-PD1	\$1,800 +travel
Training: 2-days Training at Your Facility	SRC-PD2	\$3,600 +travel

# P.I.T. Now! Alternative Energy Challenge

## Petroleum Independent Transportation Now!



VASCAR STEM Initiative

The Student Racing Challenge car is an electric car. Like engineers who are designing sustainable transportation systems, students can draw energy from common wall plugs ('on the grid'), solar panels, wind turbines, hydrogen fuel cells and other sources like bio.

Students can enter their P.I.T. Now! projects into the Student Racing Challenge and are required to do so to qualify for the Endurance Race at Regional and National Finals

Contact us to get the P.I.T. Now! competition guidelines.

### Hydrogen Fuel Cell & Solar Energy Kits.

Horizon Fuel Cell is a global innovation leader in hydrogen fuel cell technology and Ten80 partner. Horizon's H-Cell 2.0 is a fuel cell for 1:10 scale RC cars which generates electricity from hydrogen, which is stored in solid form inside Hydrosticks, and oxygen from the air.

How do you get hydrogen into the Hydrosticks? Use gas tanks or the Hydrofill which is the world's first table-top hydrogen refueling system. Use the solar panel system to operate the Hydrofill with 'free energy'.

Learn more about the hybrid hydrogen fuel cell car at [www.facebook.com/Ten80Education](http://www.facebook.com/Ten80Education). Watch the video entitled, *Ten80-Horizon Hybrid Hydrogen Fuel Cell Car [HQ]*.

#### H-Cell 2.0

Can be installed on any 1:10 scale electric RC car

- H-Cell hydrogen fuel cell with cooling fan and electrical harness
- Control box
- Four (4) Hydrosticks, pre-charged with hydrogen
- Fittings to install on Ten80's SRC-001 car
- Installation guide and alternative energy lessons

#### H-Cell 2.0 and SRC-001 Car\*

Does not include team registration for Student Racing Challenge

- H-Cell 2.0 kit as described above
- Ten80's SRC-001 car and controller
- Two (2) car batteries
- Rapid smart charger for car batteries
- Tools: Allen key set, pliers, tire wrench, 5 mm wrench, multimeter

#### Assembled Hybrid Hydrogen Fuel Cell Car

- H-Cell 2.0 and SRC-001 Car kit described above - fully assembled

#### Hydrofill

- Hydrofill table-top system to refuel Hydrosticks
- Two (2) Hydrosticks, pre-charged with hydrogen

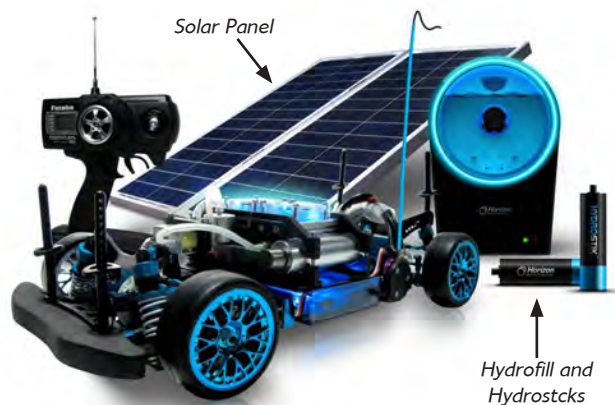
#### Hydrofill with Solar Panel

- Hydrofill Kit as described above
- Solar Panel
- Control box and battery system to operate the Hydrofill

#### Solar Panel

Not for use with the Hydrofill. Use to charge car batteries.

- Solar Panel
- Control box to recharge two car batteries simultaneously



Below, Left: H-Cell 2.0 Hydrogen fuel cell and cooling fan  
Below, Right: H-Cell 2.0 Control Box



Below: Installation bracket and fittings



P.I.T. Now Kits	Product #	Price
H-Cell 2.0*	PIT-001	\$775
H-Cell 2.0 and SRC-001 Car*	PIT-002	\$1,079
Assembled H-Fuel Cell Car*	PIT-010	\$1,495
Hydrofill	PIT-003	\$645
Hydrofill with Solar Panel	PIT-004	\$1,540
Solar Panel (not for Hydrofill)	PIT-100	\$770

\* Teams already registered can enter into the P.I.T. Now competition using this kit. For new teams that want to enter into the P.I.T. Now competition, purchase the H-Cell 2.0 Kit and a Booster Kit.

# Ten80 Student Racing Challenge: NASCAR STEM Initiative

Email: [po@ten80education.com](mailto:po@ten80education.com)

Toll-Free Fax: 866-402-5211

Toll Free Phone: 1-855-836-8033

Name: \_\_\_\_\_ School/Org: \_\_\_\_\_

Shipping Address: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_ Phone: \_\_\_\_\_

Billing Address (if different): \_\_\_\_\_ Email: \_\_\_\_\_

\_\_\_\_\_ Fax: \_\_\_\_\_

By submitting this form, you are purchasing the following items with payment to be made by the method indicated. Please keep a copy for your records and send a signed copy with your PO or payment via email, regular mail or fax.

Item	Catalog #	Quantity	\$ Each	Total \$
SRC-001 Car: 2-Car Base Kit for High School	SRC-001		\$2.296	
SRC-001 Car: 2-Car Base Kit for Middle School	SRC-MS-001		\$2.296	
SRC-001 Car: 1-Car Booster Kit for High School (no curriculum)	SRC-002		\$648	
SRC-001 Car: 1-Car Booster Kit for Middle School (no curric.)	SRC-MS-002		\$648	
SRC-001 Car: Gear Set. 2 spur and 4 pinion	SRC-005		\$39	
SRC-001 Car: Spare Parts Pack	SRC-008		\$98	
SRC-001 Car: Aluminum Upgrade, shocks & control arms (blue or purple)	SRC-007B or P		\$70	
SRC-901 Car: 2-Car Base Kit for High School	SRC-901		\$2,639	
SRC-901 Car: 1-Car Booster Kit	SRC-902		\$845	
SRC-901 Car: Spare Parts Pack	SRC-908		\$149	
Energy Pack (2 batteries)	SRC-06		\$96	
Wheel Pack (2 sets of replacement wheels)	SRC-07		\$98	
Clear 1:10 Scale Car Body	SRC-09		\$35	
Chassis Geometry Set-up Board	SRC-15		\$220	
Data Acquisition System	SRC-16		\$190	
Transponder System for up to 10 cars	SRC-RGN-01		\$2,400	
Track rail system	SRC-RGN-02		\$2,400	
Year 2+, Annual Registration Fee for 1st team	SRC-51		\$550	
Year 2+, Annual Registration Fee for each add'l team	SRC-52		\$150	
Training: Online Coaching (\$10/wk. 20 weeks)	SRC-PD0		\$200	
Training: One-day Training at Your Facility (+ travel)	SRC-PD1		\$1,800 +travel	
Training: 2-days Training at Your Facility (+ travel)	SRC-PD2		\$3,600 +travel	
	Shipping & Handling for a Base Kit		\$129	
	Shipping & Handling for a Booster Kit		\$48	
	10% Shipping & Handling for all other items 10% is waived if order includes base kit		10% of cost for 'accessories'	
<b>Total</b>				



Payment Method (Circle): *Check Enclosed*    *Credit Card*    PO#: \_\_\_\_\_

ACCEPTED AND AGREED BY: Name / Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

# Ten80 Student Racing Challenge: NASCAR STEM Initiative

## P.I.T. Now! Order Form

Email: [po@ten80education.com](mailto:po@ten80education.com)

Toll-Free Fax: 866-402-5211

Toll Free Phone: 1-855-836-8033

Name: \_\_\_\_\_

School/Organization: \_\_\_\_\_

Shipping Address: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Billing Address (if different): \_\_\_\_\_

Email: \_\_\_\_\_

\_\_\_\_\_

Fax: \_\_\_\_\_



**NASCAR STEM Initiative**

Anyone can integrate alternative energy into their programs using these kits.

Ten80 Student Racing Challenge teams already registered can enter into the P.I.T. Now competition using the H-Cell 2.0 (PIT-001) with their existing cars or cars that come with catalog numbers PIT-002 or PIT-010.

New groups that want to enter into the P.I.T. Now competition should purchase a booster kit with the H-Cell 2.0 Kit (PIT-001 + SRC-002) or register a new team (SRC-51).

Item	Catalog #	Quantity	\$ Each	Total \$
H-Cell 2.0	PIT-001		\$775	
H-Cell 2.0 and SRC-001 Car	PIT-002		\$1.079	
Assembled H-Fuel Cell Car	PIT-010		\$1.495	
Hydrofill	PIT-003		\$645	
Hydrofill with Solar Panel	PIT-004		\$1.540	
Solar Panel (not for Hydrofill)	PIT-100		\$770	
SRC-001 Car: 2-Car Base Kit for High School	SRC-001		\$2.296	
SRC-001 Car: 1-Car Booster Kit for High School (no curriculum)	SRC-002		\$648	
Registration Fee for 1st team *	SRC-51		\$550	
Annual Registration Fee for each add'l team *	SRC-52		\$150	
Shipping & Handling * Do not include in shipping calculation			5% of cost.	
<b>Total</b>				

By submitting this form, you are purchasing the following items with payment to be made by the method indicated. Please keep a copy for your records and send a signed copy with your PO or payment via email, regular mail or fax.

Payment Method (Circle): *Check Enclosed*    *Credit Card*    PO#: \_\_\_\_\_

ACCEPTED AND AGREED BY: Name / Date: \_\_\_\_\_

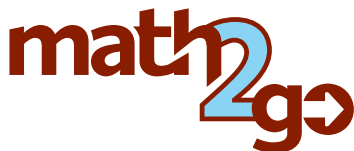
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Ten80 Student Racing Challenge: NASCAR STEM Initiative 2011-12 Camps & Clubs Order Form

Email: [po@ten80education.com](mailto:po@ten80education.com)

Toll-Free Fax: 866-402-5211

Toll Free Phone: 1-855-836-8033



Name: \_\_\_\_\_

School/Organization: \_\_\_\_\_

Shipping Address: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Billing Address (if different): \_\_\_\_\_

Email: \_\_\_\_\_

\_\_\_\_\_

Fax: \_\_\_\_\_

By submitting this form, you are purchasing the following items with payment to be made by the method indicated below. Please keep a copy for your records and send a signed copy with your PO or payment via email, regular mail or fax. To expedite handling, please notify Ten80 Education by ([po@ten80education.com](mailto:po@ten80education.com)) when the PO is sent and how it will be received:

Math2Go Race Camp Kit (Small Car), Grades 3-6		Catalog #	Qty	\$ Each	Total \$
6-Car Turn-Key Math2Go Camp for up to 24 students		M2G-21		\$2,497	
1-Car Booster Station: materials for 3 - 4 students		M2G-02		\$129	
Years 2+: Math2Go Camp license, access to new curriculum & Welcome pack		M2G-22		\$25 / person	
Hybrid Camp (Small & Big Car), Rising Gr. 7 - 9		Catalog #	Qty	\$ Each	Total \$
6-Car Turn-Key Hybrid Camp for middle grades including Math2Go small cars and Ten80 SRC 'big' 1:10 scale cars		SRC-CP-02		\$5,997	
1-Car Booster Station for middle school: materials for 3 - 4 students		SRC-MS-002		\$648	
Years 2+: Hybrid Camp license, access to new curriculum & Welcome pack		SRC-MS-22		\$25 / person	
Ten80 Student Racing Challenge Camps (Big Car), Gr. 9 - 12		Catalog #	Qty	\$ Each	Total \$
6-Car Turn-Key Ten80 Student Racing Challenge Camp Kit for up to 24 students		SRC-CP-01		\$5,997	
1-Car Ten80 SRC Booster Station; materials for 3 - 4 students		SRC-002		\$648	
Years 2+: Ten80 SRC Camp license, access to new curriculum & Welcome pack		SRC-21		\$25 / person	
Professional Development		Catalog #	Qty	\$ Each	Total \$
Training: Online (3 x one-hour sessions)		Included		Included	
Training: One-day Training at Your Facility (+ travel)		SRC-PD1		\$1,800 +travel	
Model Lessons by Ten80's team at Your Facility During Camp: 2 days (+ travel)		SRC-PD2		\$3,600 +travel	
Shipping		Catalog #	Qty	\$ Each	Total \$
Shipping & Handling for a Turn-Key Camp Kit				\$129	
Shipping & Handling for a Booster Kit				\$48	

**Total Purchase**

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Payment Method (Circle):    *Check Enclosed*    *Credit Card*    PO#: \_\_\_\_\_

ACCEPTED AND AGREED BY: Name / Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_