



**H-racer 2.0 IR Control Car
(& Solar Powered Hydrogen Station)**
(Order code O6-6531)
£72.99

Discover the automotive technologies of the future by building and driving your own hydrogen fuel cell car. The H-racer 2.0 is a scale model fuel cell car construction kit, with remote controlled steering, and light emitting features. The H-racer has received many awards including Time Magazine's "Best Inventions", Business Week IDEA, Metropolitan Home "Design 100", ID magazine annual review, and Business 2.0 Bottom Line Design Awards.

The product includes a solar cell, hydrogen station, remote control, hydrogen fuel cell car assembly parts, as well as a renewable energy education manual and a fun experiment guide.

**H2go
Hydrogen
RC Car**
(Order code O6-6543)
£87.95

The H2go is the result of 5 years of research and development in next generation energy technology. This battery-free model car is a real-working scale version of laboratory vehicles running on renewable and zero emissions hydrogen fuel. H2go is a electric hydrogen vehicle that combines fuel cells for cruising power and super-capacitors for speed. The result is a fast moving remote control car where even the remote does not need any batteries! Hydrogen is drawn from ordinary water using the solar powered refueling unit. The hydrogen is then transferred to the car to provide power. The remote control gives left, right, forward and reverse control as well as a speed boost button.

- Refuelling unit can be operated from AC adaptor if it is not easy to get to direct sunlight
- Pack includes H2go car, remote control, solar panel and refuelling unit.
- Just add water!

ECORACERS
remote controlled green energy microcars
Introducing ECORACERS, the ultimate innovation in green power

WATERRACER
This set comes with a real hydrogen fuel cell station that stores energy using water's basic elements.
£20.99 (06-6539)

SOLARRACER
This set comes with a real working miniature solar power charging station that recharges the car using energy from the sun.
£20.99 (06-6541)

The micro-car also comes with a neat docking station, a remote control, assembly guide and cool poster on how it works.



**Renewable Energy
Education Set**
(Order code O6-6537)
£133.99



This kit is a modular experiment set designed to demonstrate the workings of a complete clean energy technology system on a miniature scale. With the components supplied, an entire miniature renewable energy system can be constructed in the lab.

This set includes a real working miniature wind turbine kit, a solar photovoltaic panel, an electrolyser, a hydrogen fuel cell, and hydrogen storage system encouraging users to learn the system step by step, configure it in different ways and visualize the workings of clean energy principles from start to finish.

Supplied with full instructions and educational CD.

Hydro-Wind Kit
(Order code O6-6535)
£84.99

Turn Wind Power into Hydrogen Energy!
This set gives you the power to create your own clean energy using fuel cells and renewable hydrogen by using wind and water.

The set includes the same wind turbine and LED voltmeter that is found in the WindPitch educational kit (O6-6545). Also included is a hydrogen fuel cell, hydrogen and oxygen tanks and a fan to demonstrate the electricity that is created.

Supplied with full instructions and educational CD.



www.rapidonline.com/horizon

**WindPitch
Education Kit**
(Order code O6-6545)
£59.00

WindPitch is a small scale, real working wind turbine (wind power generator) which allows students to evaluate the pitch (angle setting) of the profiled blades. Up to 12 profile blades can be installed for evaluation. Learn how the blade pitch and number of blades affect the power output of the wind turbine to maximize the output power. The experiments also teach about stalling or reduction of the wind turbine's rotational speed to protect itself under strong wind conditions. The special 3 Phase AC alternator used in the WindPitch is similar to the one used in real commercial wind turbines. WindPitch comes with an LED Voltmeter/Music Maker Module to demonstrate how the power created from the wind energy is turned into electrical power. The pack contains documentation on wind energy with easy to follow experiments, assembly guide, and background history on the technology of wind power.

Unique New Design!
Adjustable Blade 0-55°

Renewable Energy Monitor
(Order code O6-6533)
£85.95

The Renewable Energy Monitor is an educational evaluation monitoring device with measurement software which allows graphical display of performance characteristics on your PC. The REM can also display readings on the built-in LCD screen meaning it can be used with or without a computer, indoors or outdoors.

The data gathered using the REM can then be used to optimise your renewable energy experiments and maximise the performance.

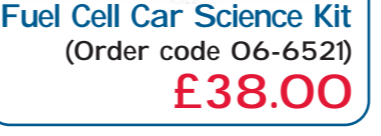
Numerous experiments and evaluation activities using hydrogen fuel cells, miniature wind turbine kits, and solar panels will now be quantifiable in real time for voltage, current, power, joules, resistance, and even RPM speed.

Compatible with any of the Horizon range of clean energy educational kits.

**Bio-Energy
Education Kit**
(Order code O6-6529)
£67.99



Fuel Cell Car Science Kit
(Order code O6-6521)
£38.00



Design & Technology
Science

NEW
ARDUINO
Open Source
Prototyping Platform
From Only £18.99

Horizon
Fuel Cell Technologies
Renewable Energy Kits
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Solar Powered Light Module Kit

TruOpto

This simple, yet effective module demonstrates how solar panels can convert the sun's energy into electricity, how it can be stored and how that energy can be released and used when required.

In sunny conditions, the Poly-Silicon solar cell converts the sun's radiant energy into 1.8V of electricity which charges the Nickel Hydride rechargeable battery. As the sun's light reduces, so does the output of the solar panel.

When the solar panel's output falls below approximately 0.7V, the circuit stops charging the battery and the captured energy remains in the battery. In darkness, the solar cell's output drops to zero which triggers the circuit to switch on the 2 LEDs to provide illumination.

The module is available both ready-assembled or as a kit of parts that can be assembled by students.

- Practical demonstration of solar power
- Rechargeable battery: 1000mAh
- More than 20 hours illumination from fully charged battery
- Over-discharging protection
- Automatic light level detection
- Ideal for educational
- Available ready assembled or in kit form

Assembled
£9.99
55-0005

Unassembled
£8.99
55-0006

Arduino Open-Source Prototyping Platform

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It is intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. The boards are preassembled and the software can be downloaded for free. The hardware reference designs (CAD files) are available under an open-source license.

Arduino can sense its environment by receiving input from a variety of sensors and can, in turn, affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language (based on wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software running on a computer (e.g. Flash, Processing, MaxMSP).

A number of accessories are available to maximise the Arduino system functionality.

Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the ATmega8U2 programmed as a USB-to-serial converter.

Arduino Nano

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

Arduino Mega 2560

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega is compatible with most shields designed for the Arduino Duemilanove or Diecimila.

Accessories

Arduino Motor Shield

This shield is based on the L298 dual full-bridge which is designed to drive inductive loads such as relays, solenoids, DC and stepping motors. Using the motor shield allows the driving and independent control of the

speed and direction of two DC motors via an Arduino board. Measurement of the current absorption of each motor is also possible. The shield is TinkerKit compatible, which means you can quickly create projects by plugging TinkerKit modules to the board.

Arduino Ethernet Shield Without PoE

The Arduino Ethernet shield is a microcontroller board based on the ATmega328. The shield has 14x digital input/output pins, 6x analog inputs, a 16MHz crystal oscillator, a RJ45 connection, a power jack, an ICSP header, and a reset button.

Arduino Ethernet Shield With PoE

Similar to the ethernet shield without PoE, this shield additionally has a Power-over-Ethernet (PoE) module that is designed to extract power from a conventional twisted pair Category 5 Ethernet cable, conforming to the IEEE 802.3af Power-over-Ethernet (PoE) standard.

Kit Workshop Base with Arduino Board

This kit contains a selection of all the components/parts necessary (including an Arduino Uno board) to participate in an introductory Arduino workshop.

Arduino Micro Server Module

The Micro Servo Module is a high quality micro servo with the standard TinkerKit 3-pin connector to be plugged in the Sensor Shield. Features 180° rotation angle, 1kg/cm torque, 0.12sec/60° speed and just 9g weight.

Arduino Servo Module

This Servo Module is a bigger version of the micro server module. A high quality servo module with the standard TinkerKit 3-pin connector to be plugged in the Sensor Shield. Features 360° rotation angle, 3.3kg/cm torque, 0.17sec/60° speed and 44g weight.

Plastic Enclosure for Arduino Boards

This box is particularly well-suited for use with the Arduino Uno and the Arduino Mega. There are also removable sliding slots for an Ethernet socket and a 9V battery. Ideal for use with wireless projects.

Arduino Xbee Shield w/o RF Module

The Xbee shield allows an Arduino board to communicate wirelessly using ZigBee. The module can communicate up to 100 feet indoors or 300 feet outdoors (with line-of-sight). It can be used as a serial/USB replacement or it can be put into a command mode and configured for a variety of broadcast and mesh networking options.

- Arduino boards are relatively inexpensive
- Cross-platform - the Arduino software runs on Windows, Macintosh OSX, and Linux operating systems
- Simple, clear programming environment
- Open source and extensible software
- Language can be expanded through C++ libraries
- AVR-C code can be added directly into Arduino programs
- Open source and extensible hardware
- Arduino is based on Atmel's ATMEGA328 and ATMEGA2560 microcontrollers



Type	Order code	1+
Uno	73-4440	18.99
Nano	73-4448	29.25
Mega 2560	73-4450	35.49
Motor shield	73-4454	16.99
Ethnet shield without PoE	73-4456	30.90
Ethnet shield with PoE	73-4458	42.00
Kit Workshop Base with board	73-4460	46.65
Micro server module	73-4462	6.00
Server module	73-4464	9.95
Plastic enclosure for boards	73-4466	8.95
Xbee shield w/o RF module	73-4469	13.95

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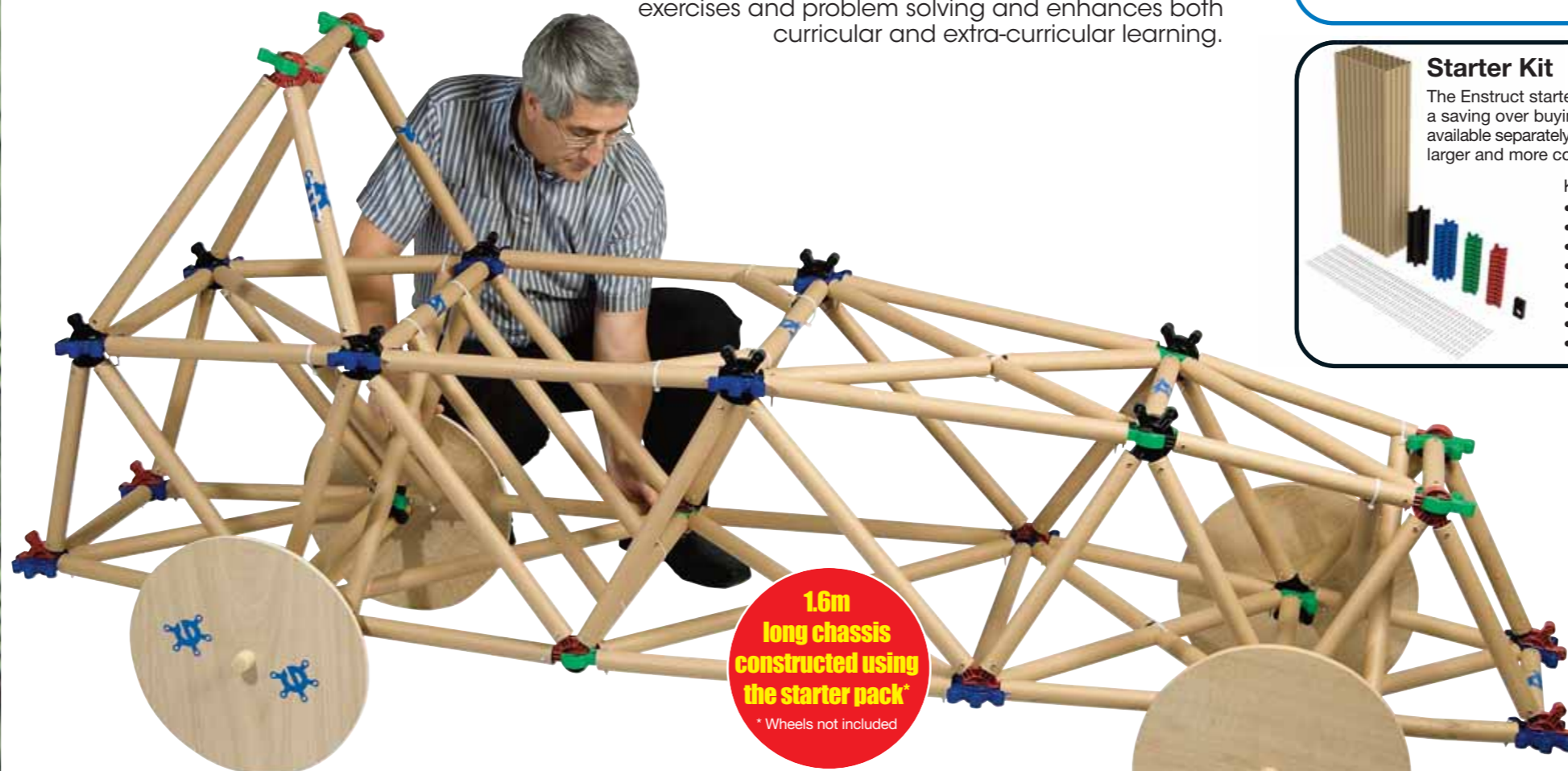
enstruct®

DESIGN ENGINEER ENSTRUCT

Enstruct transforms the teaching of structures and forces, enabling individuals or groups to create life size structures, from bridges and car chassis to light aircraft and emergency shelters.

Enstruct is a useful tool for budding architects and engineers, but also has a range of applications in Science and Drama lessons as well as Design Technology.

Because of its large scale Enstruct is ideal for team building exercises and problem solving and enhances both curricular and extra-curricular learning.



1.6m long chassis constructed using the starter pack*
*Wheels not included

Enstruct consists of the following four key parts:

Connectors

Enstruct has four different connectors which allow for a wide range of structures to be produced. The connectors are manufactured from Polypropylene (roughly 50% of which is recycled material) which makes them extremely robust.

Tubes

The connecting tubes are completely reusable and can be cut accurately to any length using the cutting and drilling jigs.

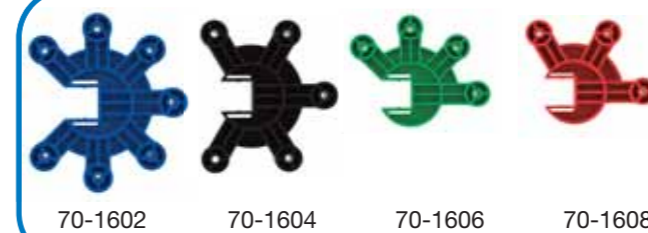
Whilst the tubes are extremely strong when used in well designed structures, they are designed to fail in poor designs. Replacement tubes are available separately.

Cutting and Drilling Jig

The cutting and drilling jig allows for tubes to be made to any length using a normal hacksaw. Holes for the fixing can then be drilled accurately to ensure that the tube fits perfectly onto any of the Enstruct connectors. The drilling and cutting jig has metal inserts so that it can be used time after time.

Fixing Pins

Steel pins are used to fix the tubes to the connectors. This makes for a quick, strong and reusable connection.



Connectors

Enstruct connectors are available in 4 different configurations allowing for a wide variety of structures to be made. Any two connectors can be clipped together to form more complex connections. They are manufactured from a tough polypropylene plastic which is made from approximately 50% recycled material.

- All connectors are supplied in packs of 12

FROM ONLY
£14.95

Diameter	Order code	1+
45° full connector pack of 12 (Blue)	70-1602	£19.95
60° full connector pack of 12 (Black)	70-1604	£19.95
45° reduced connector pack of 12 (Green)	70-1606	£14.95
60° reduced connector pack of 12 (Red)	70-1608	£14.95

Starter Kit

The Enstruct starter kit contains everything you need to get building and offers a saving over buying the components separately. All the parts in the kit are also available separately so you can continue to expand your Enstruct set to make larger and more complex structures.

Kit contents:

- 12x 45 full connectors
- 12x 45 reduced connectors
- 12x 60 full connectors
- 12x 60 reduced connectors
- 50x Enstruct tubes
- 250x joining pins
- 1x cutting and drilling jig
- Instruction leaflet with classroom activities

ONLY
£125.00
70-1600

Cutting and Drilling Jig

This jig makes it easy to cut the Enstruct tubes to the required length and accurately drill fixing holes so that they line up with the fixings on the Enstruct connectors.

Each jig has a steel insert which means that it can withstand being used with normal drill bits and hacksaws.

ONLY
£19.95
70-1614

Tubes

Enstruct tubes are 1m long and are supplied in packs of 50.

The tubes are easily cut to length using the cutting jig which is supplied in the starter kit or purchased separately.

The tubes are made from cardboard so can be recycled if they become damaged.

ONLY
£44.95
70-1610

ONLY
£5.95
70-1612

Fixing Pins

These steel fixing pins are supplied in packs of 250 and can be reused.

Orderline: 01206 751166

Fax: 01206 751188

www.rapidonline.com/enstruct

Email: sales@rapidelec.co.uk