Scorpio Technology NEWSLETTER

INSIDE THIS ISSUE

WELCOME

Exciting projects and items have arrived at Scorpio for Primary, Design and Technology and Physics. More to come over the coming months.

We're here to support you, however we can. Contact us at (03) 9802 9913 or email us at sales@scorpiotechnology.com.au

Please ensure your order and your Accounts Department has our correct details.
Scorpio Technology Vic Pty Ltd
Unit 1/31 Dalgety Street, Oakleigh Vic 3166

PRIMARY STEM: SUSTAINABLE ENERGY

Learn about sustainable energy using **Hydropower** and **Wind Power.** We have kits for that …

Build Your Own Wind Turbine

Code: FSG3378 Age 8+

Build this **STEM** kit so that you can harness the power of wind and convert it into electricity to light an LED bulb. This windmill generator can be used in or outdoors. The kit will teach you how this vital renewable energy technology works.

The blade span is 34cm when built. You need to supply an empty two-litre drink bottle and a small Phillips head screwdriver.

TEACHER CONFERENCES & WORKSHOPS

Scorpio is attending or supports these Design & Technology teacher activities:

DATTA VIC – 05/2021 Conference Melbourne
DATTA QLD - 4-5/06/2021 National & State Conference, Brisbane
DATTA AUSTRALIA –10/2021, Design & Technologies Week
iTE - 24/12/2021 Technology Education Conference, Sydney
DATTA VIC –12/2021 MAKERSPACE conference

Wind Power (V 4.0)

Code: SN627929 Age: 8+

Assemble a realistic wind turbine complete with electric generator and adjustable rotor blades that are designed with complex aerodynamic curves.

Conduct experiments to optimize the turbine's performance by adjusting the angle of the blades and discover how to use the wind turbine to light up an LED and charge a rechargeable battery. Convert the generator into an electric motor and assemble a small electric car to demonstrate an application for stored electricity.

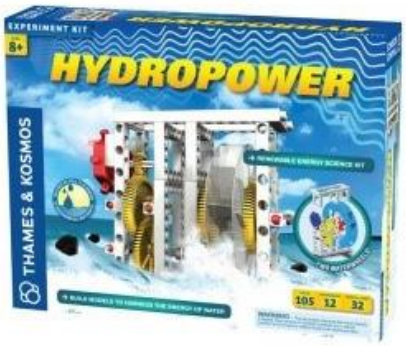
Includes a full-color, 32-page manual with instructions, 5 experiments, scientific information and information about the use of wind energy.

LEARN TO MAKE, MAKE TO LEARN

One learns by doing a thing; for though you think you know it, you have no certainty until you try.
Sophocles (born circa 496 CE in Greece)

Hydropwer

Code: HYDROP Age 8+



Assemble your own hydroelectric power station to learn all about this form of renewable energy. Then conduct through 12 hands-on experiments and building projects such as building a waterwheel, sawmill, and hammer mill that use water energy to do physical work learning about water pressure with a water tower, communicating vessels, and a fountain generating electricity with a hydroelectric power station discovering how electricity can be generated by harnessing power from ocean waves, tides, and rivers. With these projects, students will learn about surface cohesion, surface tension, and adhesion.

Includes 32 page colour manual that includes instructions and information about the potential of hydropower. Items to construct model. To complete all the activities, additional household items are required (not included).

SHIPPING DELAYS:

We at Scorpio Technology would like to apologise to everyone who has been or is still waiting for their orders, or have items on back order.

WE do understand your frustration, and we are experiencing the same frustration, as we fully understand your need to keep your students engaged and working. We hate the feeling of holding you up, and being the (perceived) cause of your problems.

Unfortunately, we are affected by circumstances beyond our control, and our planning ahead hasn't helped as much as it did in previous years. For example:

Our suppliers have had delays in getting material / parts they require to make our parts (as mentioned in the last Newsletter – much has been prioritised for PPE and other medical requirements).

Our last shipment from China (containing wheels and motors for many kits, as well as other items) was ready for shipping in mid December, but only sailed on the 29th January!

Many of you have been waiting on Infra red PCBs for your Jouster and other projects. The infra-reds have now arrived so sending them out is our first priority. These should have been on that December ship, but material shortages struck! We organised delivery by air, and apart from the pick up delay (due to Chinese New Year). All of our recent air shipments (regardless of carrier) have "enjoyed" a 2 week holiday at Singapore airport.

Again, on our behalf, our apologies for these delays to your teaching programs.

PRIMARY & SECONDARY: MODEL SOLAR VEHICLE CHALLENGE

Scorpio Technology has been involved with the Model Solar Vehicle Challenge (MSV) for many years. We provide components and kits suitable for the Competition. We were excited to hear that DATTA Vic is providing a free webinar to its members.

This Challenge has a **strong STEM focus**. It engages students and supports teamwork and co-operative learning.

MSV Challenge provides examples of real Maths. Students work with statistics, basic arithmetic for centre of mass calculations, algebra to create models to calculate ideal gear ratios for different conditions, project budgeting and more.

Please check out the support material on the Scorpio Technology website.

Click here: https://www.scorpiotechnology.com.au/model-solar-challenge-components

FREE for DATTA Vic members

Sustainable STEM- The Model Solar Vehicle Challenge (PL2070)

The Victorian Model Solar Vehicle Challenge is an engineering competition involving hundreds of primary and secondary students across Victoria. Participants design and construct their own vehicle (car or boat) which is powered by the sun. They learn real skills in design, engineering, troubleshooting, sustainability and teamwork. The best designs will go on to compete in the Australian International Model Solar Challenge against the greatest from across Australia and Taiwan.

This **webinar is for primary and secondary teachers** looking for a great way to engage their students in STEM. Find out how your students will design and construct their own sun-powered vehicle and learn real skills in design, engineering, troubleshooting, sustainability and teamwork. You'll get all the practical information you need to get started with the challenge, and you'll hear from participants about how they have linked the competition to the curriculum and the impacts it has had upon their classes.

When: 4.00 - 5.30pm, Monday 15 March
Where: Delivered via webinar - link provided on booking
Cost: Free for members.
If you wish to participate in this session, you can join DATTA Vic ***HERE***

This Month's Q&A Technology Tips: Using Twist-On Wire Connectors

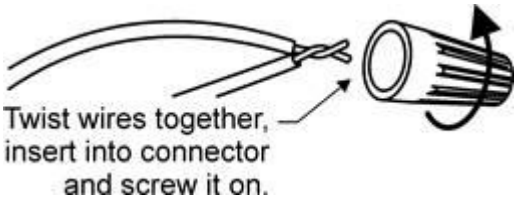
Q. Using Twist-On Wire Connectors

A. These connectors consist of a truncated cone made of moulded insulator material. Embedded inside is a screw thread. Take the two stripped ends of wire. Insert them into the cone, and twist clockwise by hand. The external grooves assist in twisting the wires together

- Join two, three, or even four wires. Provided that the bared portions of the wires are within the insulated cone, there is complete isolation.
- Join different gauges of wire together.
- The connector can be unscrewed to allow for modifications.
- Are quicker to use than soldering but not as strong or durable.
- Typically used in electrical wiring systems for light switches, receptacles, ceiling fans, can lights, thermostat controls, HVAC, smoke/CO detectors, garage doors, doorbells, security systems, recessed lighting, signage and more.

CONNECTORS SCREW-ON (PACK OF 10)

(Code: **CONN-SC**)



SECONDARY: NEW PRODUCTS

Ferrite Ring Magnet Code: **MAGFERR32**

- OD 32mm x ID 18mm x 7mm Pkt of 10
- A versatile and multi-purpose magnet.
- Permanent durable magnets with a high resistance to demagnetisation and corrosion
- High coercive force

Mini Colour Mixer
Code: **HLCOLMIXMIN**

- Students can learn about areas such as colour mixing, complementary colours, etc.
- Blue, red and green LED's shine onto a special screen for optimal mixing.
- Each dimmable LED is bright enough to be seen in an ordinary room.
- Requires three AA batteries (not included).
- Portable

Laser Ray Box 5
Code: HLLASRAYBX5

- Light Box with Laser Beams. Select five or three parallel optical beams to demonstrate the bending of light rays in most well-lit rooms.
- Demonstrate light bending by reflection, Focusing effect, Reflection with mirrors, Fresnel reflection, Monochro-matic character of laser light and Total Internal refection.
- Fast set up
- Operated by a rechargeable NiCd battery.

DID YOU KNOW?

Australians are great inventors. We claim many of the world-wide firsts.

- Full Length Feature Film,
- Black Box Flight Recorder,
- Inflatable Escape Slide on planes,
- Baby Safety Capsule,
- Ultrasound Scanner,
- Cochlear Implant,
- Electronic Cardiac Pacemaker,
- Variable Rack and Pinion Steering,
- Refridgerator,
- Power Board,
- Rotary Clothes line (Hills Hoist),
- and the list continues…

https://www.weekendnotes.com/60-great-australian-inventions/

DESIGN PROCESS IN INDUSTRY VS TECHNOLOGY CLASSROOM

Written by Arnie Vejins

Do students ever ask if there are real world applications to what they are learning? A great example is to look at the Design and Development processes of the Vehicle Industry. It is a more complex system but the basic principles are the same as those carried out by your students.

WHAT IS A PACKAGING STUDY? WHAT ABOUT VEHICLE PACKAGING?

These are automotive terms used in the planning and design of cars. The principles are used in many other industries although they will have different terms for them.

PACKAGING STUDY:

This could also be known as a feasibility study. One example of this is when a car company wants to investigate if it is possible to fit a different engine into an existing car (e.g. to fit a Chevy Camaro engine into a Commodore). This involves investigating 2 things:

1. **Will it physically fit?** This involves looking at the proposed engine (size, shape, mountings etc.) and the existing vehicle's constraints (the under-bonnet environment, including the size of the engine compartment, the location of the firewall, the bonnet line, existing fittings such as radiator, air conditioning modules, ABS unit and so on).
2. **Can it be made to work?** That is, can the left hand drive engine be connected to a car that is set up for right hand drive? This looks at whether it is possible, what would need to be done to connect and integrate everything, for example: power steering, brake module, mounting the engine, cooling system, and even fuel pump sizing.

VEHICLE PACKAGING:

This consists of making it happen! For the above example it consists of designing the actual parts that will be needed to make the components and assemble the car.

On a simpler level, it could consist of something less complicated such as installing and wiring up a different sound system in the car.

DO THESE APPLY TO DESIGN IN TECHNOLOGY?

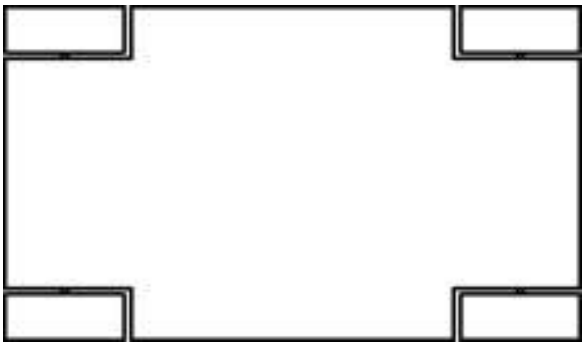
Yes, the tasks and design may be a lot less complex, but the principle is still the same – designing and making an integrated design that considers all of the existing constraints to make it all work as required.

Using our kits, one of the constraints on the student are the components supplied in the kit. There could also be other constraints, for example, if the teacher tells the class the maximum material size that can be used. Complexity also comes into play if you are planning to have the students design a body to print on a 3D printer. This requires the students to really make sure that they understand the constraints that they are working with.

Some simple examples encountered during the design process are shown below, and alternative solutions are shown in each case.

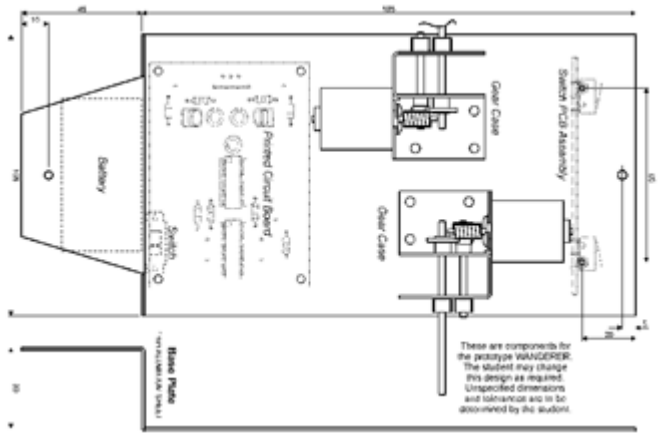
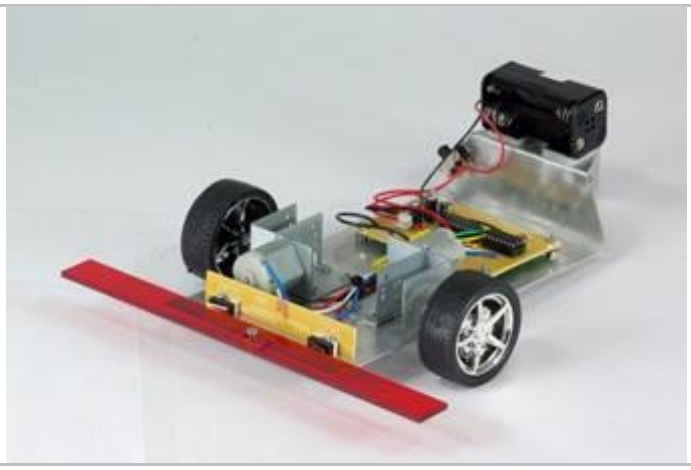
EXAMPLE 1: PLATFORM / CHASSIS WIDTH - BELT DRIVEN CAR.

These are the components supplied in the kit. The constraints to the maximum vehicle width are defined by the: • Length of the axles – 120mm • The depth of the hole in the wheels that the axles are inserted into – 17mm each side, giving 34mm total	

This leaves a platform width of 86mm – if using a rectangular piece of material.	However, if a much wider vehicle is desired, cut-outs can be made for the wheels to allow wider material to be used and to allow a wider vehicle to be constructed.
	

EXAMPLE 2: AESTHETICS / MATERIAL CONSTRAINTS, etc. - WANDERER.

The easiest and most usual way to mount components is by laying them out flat. For example, this is what the WANDERER V2 design looks like when done that way. Thus it requires a piece of aluminium 260mm long, and looks like the model below.

	
However, if the supplied piece of aluminium is only 200mm long, or the aesthetics aren't pleasing, then another approach needs to be found. In this case the solution was to think of the project in 3D, and mount the PCB above the gearboxes. This allowed a much more compact vehicle to be made.