



WELCOME

Summer's on the way! We've found some great Summer projects and information to keep your classroom learning exciting at the end of the school year.

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

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Feature article: Future of Solar Cells

PRIMARY STEM: SOLAR POWER

DID YOU KNOW?

The sun has been generating energy for billions of years. Life on Earth depends on this energy.

The Earth receives more energy from the sun in an hour than is used in the entire world in one year.

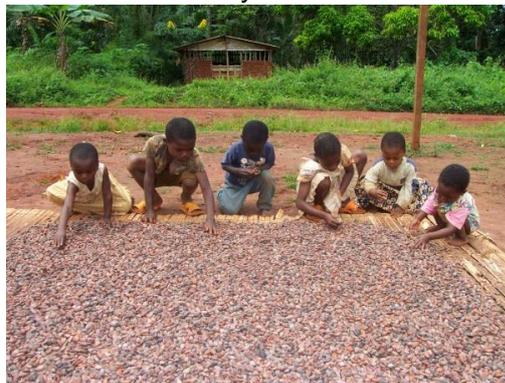
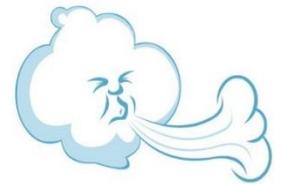
We can use solar energy in two different ways: as a heat source and as a light source.

Solar energy works best on days when it's sunny with no clouds. When the sun goes behind a cloud it can't provide as much energy on ground level. This is why we can't rely on solar energy alone.

Wind is a form of solar power, created by the uneven heating of the Earth's surface.

USING SOLAR POWER

People have used the sun as a heat source for thousands of years.



(Photo by The International Institute of Tropical Agriculture)

In many African villages, the people use the sun's energy to dry foodstuffs like fish, corn, snails, frogs and cocoa for storage.

They spread the foods on large mats and trays in the hot sun for days until the food is dried. These sundried cocoa beans are used to make chocolate.

TEACHER CONFERENCES, WORKSHOPS & EVENTS



Scorpio is attending or supports these teacher activities:

Tasmanian Model Solar Challenge 2023, Clarence High School, Hobart **25/11/2023**.

Australian-International Model Solar Challenge 2023, Clarence High School, Hobart, **26/11/2023**.

iTE Technology Education Conference 2023 TechExpo, Sydney **30/11/2023 – 01/12/2023**.

DATTA WA Conference Bridging the Gap, Perth, **30/11 to 01/12/2023**.

DATTA VIC Conference Future Innovators, NCAT Preston **01/12/2023**.

LEARN TO MAKE,
MAKE TO LEARN

“Energy is liberated matter, matter is energy waiting to happen.”

Bill Bryson

American journalist and author





A great range of new products to use in your classroom.

PRIMARY BASIC ELECTRICITY KIT – Part A (Code: BKEPH2011)

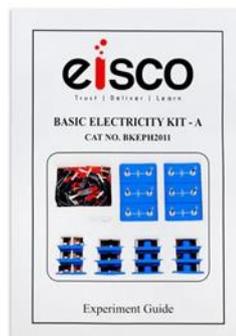
Introduce students to electricity basics. Perfect for home education or for 6 students in a classroom.

Build simple circuits and explore bulbs & cells, switches, electromagnets, motors and buzzers. Additionally, students will be introduced to electrical symbols, simple electricians' shorthand, the basics of electrical currents, short circuits and switches.

Features:

- Structured instructional manual that provide a range of tasks and investigations to explore.
- Robust components mounted on hardy plastic bases, each with two 4mm sockets.

Set includes 6 cell holders, 6 bulb holders, 3 press switches, 3 two-way switches, 18 connecting leads and 6 miniature light bulbs.



MINI FOG MACHINE WITH RGB LEDS (Code: AF1225)

The bright built-in RGB LEDs produce amazing lighting effects. It is an ideal machine for laser and light experiments in the lab.

It has an onboard reservoir to hold the and can be triggered from the included wired remote control.

Features:

- 400W compact fog machine by Digitech
- 3 x 1W RGB LED Lights
- 5 Minute Heat Up Time
- 300ml Tank Capacity sprays fog up to 3.5m
- Mains Powered – power cable incl.
- Mounting Bracket Included
- Wired Remote Control
- Dimensions: 140 x 130 x 250mm – 1.8kg



NOTE: Fog liquid (available separately).

3D PRINTERS AND CONSUMABLES

Is it time to replace your 3D printer or purchase a new one? We now offer a range of 3D printers, filaments, and resins. They are only available on back order. See our online Product Catalogue for a comprehensive listing.

PRINTER PEN – LOW TEMPERATURE PCL FILAMENT PEN KIT (Code: TL4580) Specifically designed for children thanks to its compact design & non-toxic filament that prints with low heat and leaves no mess.

3D PEN KIT – HIGH TEMP PLA (Code: TL4582). This 3D printing pen allows you to create amazing 3D artwork. The pen is easy to handle and operates smoothly. The machine will recognize new PLA and ABS filament when you insert them and is great for gluing together or cleaning up your 3D printed models. A USB cable and an AC adapter are included. Recommended for ages 14+.

Victorian Model Solar Challenge 2023 Event



The Model Solar Challenge was held at Parkhill Primary. As always, it was a great event. Teams participated with their solar boats, solar cars and Sheridan kit cars.

Congratulations to the winners in each category. The teams were also judged for Encouragement Award, Best Poster, Best Video, Best First Entry, Best Decorated Boat, Best Uniform.

You can see photos from the day and links to videos students produced on the VMSVC Facebook page - <https://www.facebook.com/ModelSolarVehicleChallenge>

Category	First Prize	Second Prize	Third Prize
Junior Boats	Congupna PS 219 All Four Cylinders	Spensley Street PS 245 Electric	Congupna PS 222 The River Rippers
Advanced Boats	St Monica's College 121 SMC2	St Monica's College 122 SMC79	St Monica's College 119 SMC1
Sheridan Kit Cars	Mentone Grammar 417 9A Team 2	St Monica's College 430 SMC 05	Mentone Grammar 411 7B Team 3
Student Designed Cars	Caulfield Grammar 820 The Ant	Box Hill High School 808 Turtle Taxi	Box Hill High School 817 Solar Queen



TMSC
School Solar Challenge
www.tassolarchallenge.org



Australian-International Model Solar Challenge

Tasmanian Model Solar Challenge and Australian-International Model Solar Challenge 2023

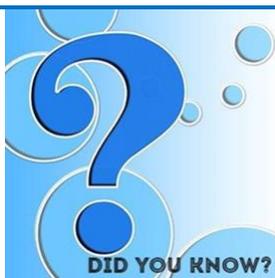
THE ULTIMATE STEM CHALLENGE

The Australian-International Model Solar Challenge stands as a prestigious nationwide school competition. It unites finalists from each state and territory, with participants even joining from countries such as Taiwan, to vie for the title of designing the fastest model solar-powered car. Beyond this exciting competition, it deeply engages students across STEM disciplines and empowers them with a hands-on project limited only by their imagination.

This year, Tasmania will once again serve as the host for the Australian-International Model Solar Challenge, scheduled to take place at Clarence High School in Hobart on November 25th and 26th. On Saturday, Tasmanian teams will compete to secure their positions for the knockout rounds, with the top performers earning the honour of representing our state.

I am acutely aware of the importance of extending these opportunities to students who may not have access to extracurricular activities. This initiative has the potential to elevate Tasmania's standing as a leader in scientific education and bridge the gap in our state's science education standards.

Zane Farnum, Vice-President & Secretary
Tasmanian Model Solar Challenge



What would happen if Solar panels were installed in the Sahara Desert?

If 1.2% of the Sahara Desert was covered with solar panels the energy demands of the whole world could be met. The result would change the desert environment by doubling the rainfall by 20%.



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FUTURE OF SOLAR CELLS

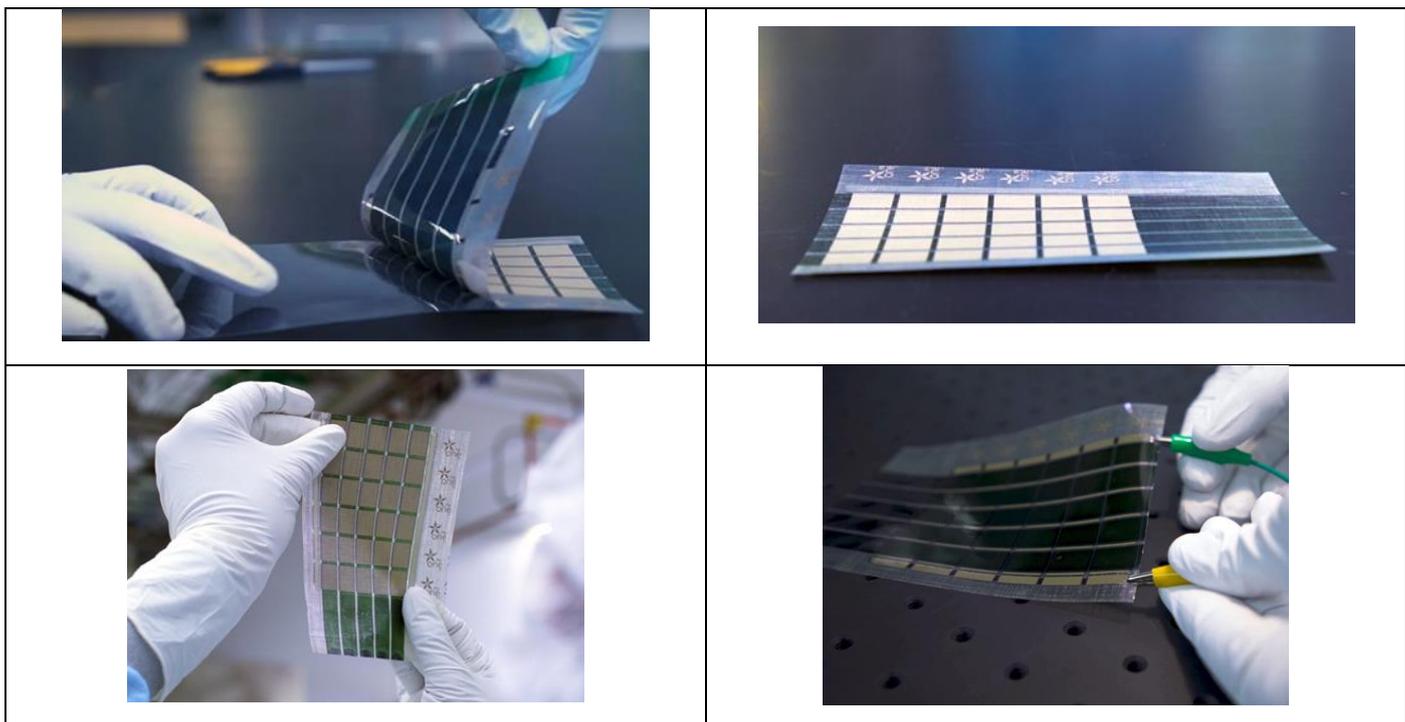
Solar panels have been available for some time. Increasingly rooftops are covered with solar panels that are used to provide for household energy needs. Current solar panels need to be replaced every 25 to 30 years that will result in large amounts of waste as these panels age.

Research into renewable energy has been ongoing with the goal of developing greener and smarter energy sources. Researchers (Vladimir Bulović, Mayuran Saravanapavanantham, and Jeremiah Mwaura) at Massachusetts Institute of Technology (MIT) have developed a way to change how we manufacture and use solar cells in the future.

WHAT IS DIFFERENT?

- The solar cells are lightweight, flexible, and durable while being thinner than a human hair.
- Weighing 100 times less than conventional solar cells they can produce 18 times more energy per kilogram.
- Semiconducting inks are deposited on film in a process similar to screen printing. An electrode is deposited onto a prepared, releasable substrate to complete the solar module. The printed area is then peeled off to form the solar module. This process will be suitable for large area manufacturing in the future.
- Due to their thickness the printed solar modules are extremely fragile and can tear easily. Researchers addressed this problem by with UV-curable glue onto a strong light weight fabric called Dyneema Composite Fabric. This gives them flexibility and strength. The fabric retained more than 90% of the initial power generation capabilities even when rolled more than 500 times. They found that printing straight onto the fabric was not effective due to the processing steps required.
- The printed cells can be glued onto most surfaces.
- The lightweight composition presents an environmentally conscious alternative, significantly reducing solar waste and offer a more adaptable solution for renewable power generation.
- The solar cells will be useful when traditional solar panels are not suitable or available.

Photo Credits: Melanie Gonick, MIT



POSSIBLE USES

- Could be used on clothing or fabrics to provide power to charge phones etc.
- Could be applied onto tents and tarps and deployed in remote or disaster recovery operations where power is unavailable to aid humanitarian efforts.
- Could be used on the sails of a boat to provide power at sea.
- Applied onto the wings of drones to extend their flying range.

The MIT researchers have one more challenge to solve. They need to develop an ultralight case to protect the solar cells from moisture and oxygen in the air that could affect their performance.

Click here to view MIT's video. [Watch Video https://news.mit.edu/2022/ultrathin-solar-cells-1209#article-video-inline](https://news.mit.edu/2022/ultrathin-solar-cells-1209#article-video-inline)

Researchers at other universities are conducting their own research. The National University of Singapore (NUS) has set a record in the power conversion efficiency of solar cells made using **perovskite** and organic materials. Researchers at Stanford University have achieved record efficiencies using photovoltaic materials called **transition metal dichalcogenides** – or TMDs, but these materials have a lower efficiency than silicon cells.

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- <https://news.stanford.edu/2021/12/14/new-materials-deliver-ultrathin-solar-panel/>

	<h3>FUN IN THE SUN</h3> <p>How do you solve a problem like climate change? One watt at a time.</p> <p>Why did the astronaut have solar panels on his space suit? Because he wanted to be charged up for his mission!</p> <p>Why did the student put a solar panel on his backpack? So, he could get an A+ in solar energy!</p> <p>August 20, 2020: Scientists have discovered a "mystery object" in space. The object is equal to 2.6 solar masses. March 1, 2021: (Update) Scientists have determined that the "mystery object" is made up of unmatched socks.</p>
	<h3>BIOLOGY MODEL CLEARANCE</h3> <p>Help us make way in our warehouse for a new range of products. Limited stock still available. Check out our extremely low prices.</p> <p>Click here: https://www.scorpiotechnology.com.au/sale-items</p>