Scorpio Technology NEWSLETTER

INSIDE THIS ISSUE

TEACHER CONFERENCES & WORKSHOPS

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

DATTA AUSTRALIA – 11-17/10/21 Design & Technologies Week Theme: "*Developing Creative Problem Solvers*"
iTE – 24-26/12/2021 Technology Education Conference, Sydney
DATTA VIC – 2-3/12/2021 Conference "*Preferred Futures*" and Makerspace

WELCOME

We know this is a challenging moment for many of of you, and we're here to help however we can.

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

LOCKDOWN: HOW CAN WE HELP?

With Covid-19 once again causing school lockdowns we are once again offering this special offer to support you during this challenging time.

SPECIAL OFFERS FOR HOME LEARNING PHASE

- We are offering a FREE service - packing items for individual students. We can package these into packs for students (e.g. a kit + hook-up wire + corflute base + batteries + double sided tape squares). This will help you distribute items quickly.
- If buying tools for students to take home, we can pack them into "student packs" for you – and we will give you a 5% discount
- If buying a 40W soldering iron for students to take home, we can include a 2m length of 0.71mm 60/40 solder and a 15cm length of desolder braid at no cost (but tell us they are for students)

***NOTE**: these special offers only apply during the Home based learning phase of Covid-19, and are designed to help you during this difficult time.*

PRIMARY STEM: THINK LIKE A SCIENTIST

Children are naturally curious about the world around them and use similar steps to study the world as would a scientist.

Encourage them through the use of STEM skills – problem-solving, critical thinking, collection and interpretation of information, and communication of results. Scientific vocabulary and a scientific method form part of this skill development.

Scientific Method is made up of a number of steps and open-ended questions leading children to make observations and to solve scientific problems.
PROBLEM: What is the question? What do we still need to find out?
HYPOTHESIS: Make a prediction that answers the question.
EXPERIMENT: Experiment to test your hypothesis.
RESULTS: Record and analyse all your results.
CONCLUSION: Draw a conclusion. Was the hypothesis right? Why / why not? Do you need to retest the question? Share the results.

LEARN TO MAKE, MAKE TO LEARN

"No great discovery was ever made without a bold guess."

Isaac Newton,
Mathematician, physicist, astronomer, theologian, and author

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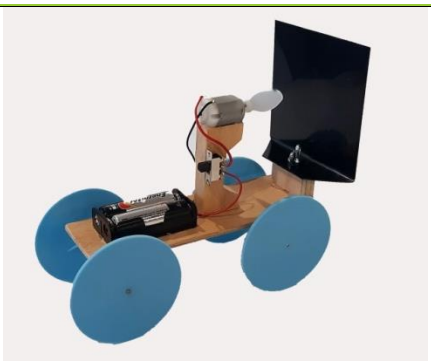
SECONDARY: SCORPIO'S OWN NEWEST PRODUCTS

DESCRIPTION

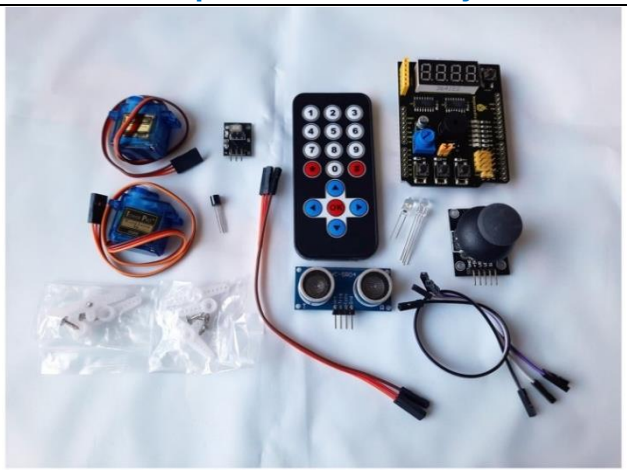
The ***BLUE FIN FAN CART*** is a simple four wheeled, propeller driven device with a sail that can be adjusted or removed. The propeller is driven by a small battery powered electric motor. Includes a lesson plan.

Designed to examine Newton's Laws of motion, inertia, acceleration and action/reaction.by demonstrating what happens when a sail is added or removed when fan is switched on.
2 x AA batteries required (not included).



Tie **Physics** with **Design & Technology** with the **BLUE FIN FAN CART** (Code: BLUEFIN)

Pat's Multi-Purpose Shield 8 Projects Bundle (Code: PATSMULTI8BUND)



Multi-Purpose shield plus one set of components (Code: PATSMULTI8BUND)

Pat McMahon has developed 8 different experiments for students to familiarise themselves with working with the Multi-Purpose Shield (MPS) and UNO R3. There are extended ports on the shield to help you to complete other experiments.

Multi-purpose Shield V2 (MPS) is a learning board based on the Arduino and Arduino compatible UNO R3. It mounts on top of the UNO R3. Download the programs from the internet to be able to carry out the experiments, or if required we can provide the sketches for Pat's experiments.

The components required are: Temperature sensor, Ultrasonic module, 2 x Servo motors, RGB LED, Thumb Joystick, IR Receiver, Dupont cable and Infra Red IR Wireless Remote Control Module.

The MPS is available separately, it can be bundled with the components for the experiments, or the components can be ordered separately.

- Multi-Purpose shield plus one set of components (Code: PATSMULTI8BUND)
- Set of components for use with the Multi-purpose shield (Code: PATSMULTI8)

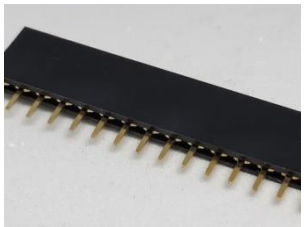
NEW PRODUCTS:

Infrared IR Wireless Remote Control Module
Code: IRREMOTEMOD

Ultra-thin Infrared IR Wireless Remote Control Module Kits for Arduino. Infrared wireless remote

40 Pin Male to Female Ribbon Cable - 20cm
Code: WIREJU40PMF

- 20cm multi-coloured Breadboard Jumper Wires
- 1 pin-1 pin male to female, Dupont-style



Header Strip - 40 Pin - Female
Code: HEADST40F

Specifications:

- Connector type: Female Header
- Good for prototyping

Battery Holder - 6xAA with Switch & Cover - 2.1mm DC Plug
Code: BH6AAUNO

- Fits 6xAA Batteries with cover and On-Off switch.
- Arduino compatible.

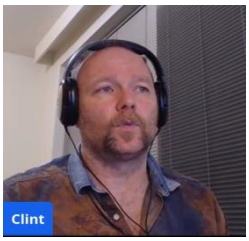
control kit consists of: • 38KHz IR remote control, with 17 function keys, range of up to 8 meters • Infrared receiver modules • Infrared transmitting LED.	crimp cable, 40-pin standard 2.54mm pitch housing connector • Pull them apart as you need them. • Suits DIY experiment / electronic projects / Arduino breadboard / PC motherboard / PCB projects.	**40 Pin Strip For UNO R3** Code: PIN40 • Supplied with the UNO R3. • 2.54mm single row male pin header strip for prototype shield. Pin length: 11mm. • Compatible for Arduino® projects.	• 150mm DC Cable 2.1mm plug (centre positive)

Click on link: https://www.scorpiotechnology.com.au/catalogues

PRIMARY AND SECONDARY:

Victorian Model Solar Vehicle Challenge

https://www.facebook.com/ModelSolarVehicleChallenge



Message from Clint Steele, VMSVC Chair,

To help teachers new to Model Solar Vehicle Challenge or those simply looking for STEM options, MSV are running online live events. These events explain the challenges and give advice on how to make the most of them.

It would be good to see you there to:

- ask any questions you might have
- answer questions put by other teachers
- connect more with us and others involved in the challenge

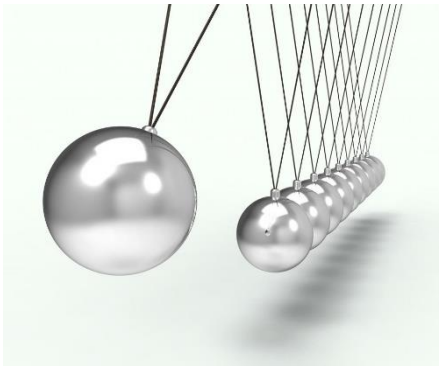
We are hoping this will be the start of a regular thing we do so you and others can learn more and more about how to make the most of MSVC. If there are any topics you would like us to cover, then let me know - I will organise a session on it.

Please also share this link with any other teachers or networks you are connected with. This will help other teachers and help build a bigger event so we can all get more from it.

Why teach Model Solar?

- Ideal for any teacher wanting to be better at the E in STEM. One of the big differentiators between the successful boats and others.
- Students experience engineering and product development while making solar boats or cars.
- Students experience different testing methods so they can take an average vehicle to a winning vehicle.
- Learn more how different components, such bearings, and mounting them to create better vehicle performance.
- Model Solar is an excellent way to teach Applied Maths (and thus Maths in general) to students. Use a Excel model solar car simulator to demonstrate to students how maths can be useful and to motivate their interest as students are able to see the outcome of key decisions quickly.

  You can see the link to the sessions here
  https://www.facebook.com/ModelSolarVehicleChallenge/live_videos



The Apple And Gravity Guy - Sir Isaac Newton (1643–1727)

Article written by Alex Kapoyanis

"I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

"Tis much better to do a little with certainty & leave the rest for others that come after you."

***Isaac Newton,* (1643-1727)**

Mathematician, physicist, astronomer, theologian, and author

Isaac Newton is one of the most well-known figures in science and, following in the impressive footsteps of the Galileo Galilei (1564 – 1642), is regarded as the "principle architect of classical mechanics" (Halliday & Resnick, 1977, p. 74). His three laws of motion, published in the 1687 book "Philosophie Naturalis Principia Mathematica" (aka "Principia"), form the basis of mechanics, physics' oldest and most basic branch. Newton's laws "relate to the motion and interaction of particles of ordinary size" (Weidner & Sells, 1973, p. 55) in many environments. However, this was only a part of the many areas of interest that Newton had.

Newton was born in the same year in which Galileo Galilei died – actually both events either took place on the same day or within a matter of days. At the age of 3, Newton was left in his grandmother's care, after his widowed mother moved to a nearby village with her new husband. It is likely that a sense of abandonment in his early childhood may have moulded his secretive and possessive behaviour as an adult.

Nevertheless, Newton's interest in mechanics and technology as a child was noticed by both his uncle and his headmaster. After a brief forced withdrawal from school – his mother wanted him to run the family farm – Newton resumed his studies in the local school before enrolling at Trinity College at the University of Cambridge.

A medallion issued by the Royal Mint in 1727 the year of Newton's death
Source: Photo: https://mathshistory.st-andrews.ac.uk/Biographies/Newton/pictdisplay/

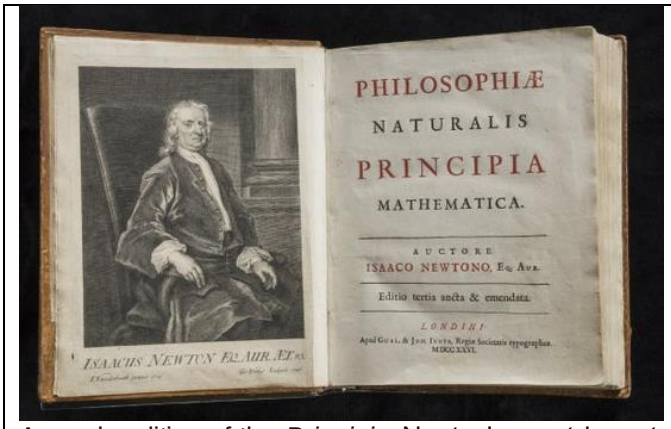
During 1665-66, his 18 or so months away from Cambridge, in isolation at this family manor due to the closure of the university at the height of the plague, was to be his most productive time. He worked on developing a solution on work done by French mathematicians Descartes & de Fermat on universal equations involving fluctuating. This is a field known as calculus. His three laws of motion were also formulated during this period.

By building on the late 16th Century work of Galileo, and even that of Johannes Kepler's laws of planetary motion, using the advances made in the fields of physics, astronomy and mathematics, Newton was able to formulate the law of universal gravitation. Watching an apple fall from a tree may have helped spur this idea, but that apple certainly did not fall on his head.

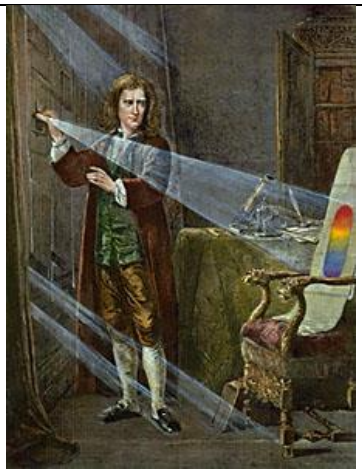
This scientific discovery on gravity would be marred by controversy. Following the Sir Edmund Halley financed publication of the Principia, Newton's contemporary, Robert Hooke (*see June 2021 Newsletter feature article "A Man of Many Talents – Robert Hooke"*), "accused Newton of plagiarism, of taking over his ideas expressed in previous works" (Sfetcu, 2019, p. 2), without giving him proper recognition in

the book. Hooke may well have been instrumental in planting the idea of the topic in Newton's mind through some cordial correspondence between the two men in 1679-1680, however, Hooke never formulated his demonstrations in a mathematical form. Their relationship soured and they would continue to be great rivals.

The two men also differed in opinion on the properties of light and it is quite interesting that he did not publish his comprehensive work on optics and light, in a book titled "Opticks" until the year following Hooke's death, perhaps as a result of the fact he was very sensitive to criticism.



An early edition of the *Principia*, Newton's most important publication. Image via U.K. National Trust/ Woolsthorpe Manor.


A painting in the Bank of America's Museum shows Newton allowing light, via a prism, to reveal the spectrum on a piece of white card resting on a chair.

His experiments led to the theory that red, yellow and blue were the primary colors from which all other colors are derived.

By age 40, Newton had accomplished all his scientific work. Upon returning to his childhood home in Woolsthorpe, he focused his attention on religious works and fruitless alchemical research, in private, over quite a few years.

Being the steely character that he was, and despite his own devout religious beliefs, Newton took on and succeeded in fending off the then reigning king, from his attempt to Catholicise Cambridge University. This led Newton being elected a Member of Parliament in 1689 for a couple of years.

Newton would continue in public service when he was appointed to the Warden of the Royal Mint. Although this was largely a ceremonial role, he took on the position with such zest and set about at exposing and prosecuting counterfeiters with much determination. He also set about overhauling the currency by recalling all coins (made of silver) to have them melted and reset in a design he developed which included the now familiar milled (ridged) edges. He was so successful at his tasks, that he was made Master of the Mint for the remainder of his life.

Following Hooke's death in 1703, Newton was appointed President of the Royal Society. It is believed that Newton took advantage of his prestigious position and attempted to "callously tarnish the reputations of some of his contemporaries" (Osman, 2016), as well as declare that he developed calculus before the German polymath, Gottfried Wilhelm von Leibniz (1571-1630) – a claim that was to be later proved wrong.

Isaac Newton, the genius and great contributor to the field of classical mechanics, passed away in his sleep on March 20th, 1727, aged 84, and was given the honour of being buried in Westminster Abbey in London.

"The seed of a tree has the nature of a branch or twig or bud. It is a part of the tree, but if separated and set in the earth to be better nourished, the embryo or young tree contained in it takes root and grows into a new tree." (Isaac Newton)

TIMELINE

1642	Born at Woolsthorpe Manor, near Grantham, Lincolnshire, England on Christmas Day.
1661	Enrolled at Trinity College, University of Cambridge, Cambridge
1665 - 1666	Bubonic plague – Cambridge University closes – Newton returns home to Woolthorpe Manor. Over 18 months at family home, developed calculus and contributes to other mathematical fields. Experimented with optics and light.
1666	Expanded and mathematically formulated the work begun by Galileo on the law of universal gravitation. Developed his famous three laws of motion.
1667	Returned to re-opened Cambridge university.
1669	Appointed the Lucasian professor of mathematics, aged 26.

1670/71	Developed new telescope design using mirrors instead of traditional lenses, reducing chromatic aberration. Presented some of his theories on light & colours to members of the Royal Society.
1679	Self-imposed exile at Woolsthorpe. Focused on alchemy & radical religious work.
1686/87	Published the three laws of motion and law of universal gravitation in the "Philosophiae Naturalis Principia Mathematica".
1689	Elected Member of Parliament. Held for 2 years.
1693	Suffers a probable nervous breakdown.
1696	Appointed Warden at the Royal Mint
1699	Appointed Master of the Mint.
1701	Newton anonymously publishes his work in Latin on his law of cooling in a short article called "Scala graduum Caloris". No formula was provided in this article.
1703	Elected President of the Royal Society.
1704	Publishes "Opticks", his work on light and colour based on the Corpuscular Theory.
1726	Relays the story of watching an apple fall from a tree at Woolsthorpe, prompting him to thing about gravity.
1727	Dies, aged 84, on March 20th.

EXPLORE NEWTON'S EXPERIMENTS IN YOUR CLASSROOM.

LIGHT, APPLIED LIGHT AND OPTICS:

Newton's Colour disc:	Hand Driven (Code: PH0582A), Hand Spun (Code: PH0582HS), Driven by Motor (Code: AR1110610)
Prisms:	Available in sets or individually

FORCES, ENERGY & MOTION

Newton's Cradle	Code: PH0346ECB
Newton Fan	Code: NTN-FN
Blue Fin Fan Cart	Code: BLUEFIN
Newton's Fixed Angle Fan Cart	Code: 3568-00
Fan Car Code	Code: FANCAR
Newton Spring Balances	Range of different capacities

GRAVITY

Newton's Apples - 6 Pack	Code: 5146-00
"G" by Free Fall Apparatus	Code: GFYE14-V2

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