Scorpio Technology NEWSLETTER

INSIDE THIS ISSUE

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

WELCOME

Welcome back! We trust that all you and your families are safe, well and rested after your summer break.

Last year's challenges gave us all an opportunity to evaluate how we can work in a changed environment. By adapting, so much was achieved by everyone.

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

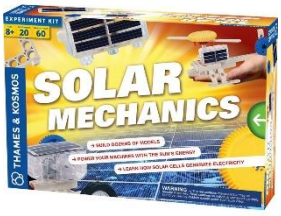
We'd like to ask a favour from you.
Some of you are still using our old address.Please make sure your order and your Accounts Department has our correct details.
Scorpio Technology Vic Pty Ltd
Unit 1/31 Dalgety Street, Oakleigh Vic 3166

PRIMARY STEM: EXPLORE ALTERNATE ENERGY

Energy is a complicated concept with so many components. Let your students explore alternate energy with these great projects:

4M - GREEN SCIENCE - ECO-TECH BULB

Code: FSG3426 Age 5+
Power up this ingenious overhead lamp with gravity to light up your surroundings. You can also bring it with you and crank the handle to create a dynamo torch. Contains 1 set plastic parts, 1m rope, 7 screws, 1 set of foam strip and detailed instructions. You need to supply a small cross head screw and plastic bottle.



SOLAR MECHANICS SCIENCE KIT

Code: SN665068 Age 8+
Build 20 solar models such as cars, trucks, planes, windmills, waterwheels, robots, and other vehicles. .Learn how to convert energy from sunlight into mechanical energy. Includes photovoltaic cell and an electric motor joined together in one compact unit and 60 page experiment manual.

4M - ECO ENGINEERING - SOLAR PLANE MOBILE

Code: FSG3376 Age: 8+
Build this solar powered aircraft mobile. Take it out in the sunshine and watch it glide around. Easy to assemble, no batteries required.

LEARN TO MAKE, MAKE TO LEARN

Learning gives knowledge, knowledge gives confidence, confidence gives character and character creates a person. *Unknown*

SECONDARY: BITS & BOBS FOR YOUR CLASSROOM

		
Clip-On Battery Connector - 2.1mm Plg Code: **BCLIPUNO**	**Socket With Screw Terminal Socket, 2.1mm** Code: **SOCTERMSC**	**Plug With Screw Terminals 2.1mm** **Code: PLUGTERMSCR**
		
Battery Holder-4aa-Cover, Sw,Conn 2.1mm Code: **BH4AAUNO**	**Tape Measure-3m-Enclosed Reel** **Code: TAPEM3ENC**	**Trojan Open Reel 30m Tape Measure** **Code: TAPEM30D**
		
Tape Measure 30m-Open Reel-Economy **Code: TAPEM30E**.	**Ruler-30mm-Multi-Ratio Tech** **Code: RULEM30TECH**	**Ruler-300mm - Stainless Steel** **Code: RULEM30F**

This Month's Q&A Technology Tips: PCB Holder VS Third hand

Q. What is the differences between the use of the PCB Holder and the Third hand?

A. These tools are available from Scorpio to assist in Electronics classes or other projects where an additional "hand" is required.

The **Third-Hand (Code: THIRDHAND)** features a stand, magnifying glass and clips.
This tool uses alligator clips to hold a PCB when soldering or reworking keeping your hands free. The magnifier helps when inspecting soldering. It can be partnered with other tools to test the PCB.

The **PCB holder for soldering (Code: PCBHOLD)** has a sturdy and adjustable rigid metal stand. It is useful for soldering, de-soldering or rework. The PCB can be rotated 360° and stay set in any position. The PCB is held by two adjustable grips that suit various board sizes.

Design and Technology is about providing opportunities for students to develop their capability, combining their designing and making skills with knowledge and understanding in order to create quality products.
(https://www.data.org.uk/for-education/)

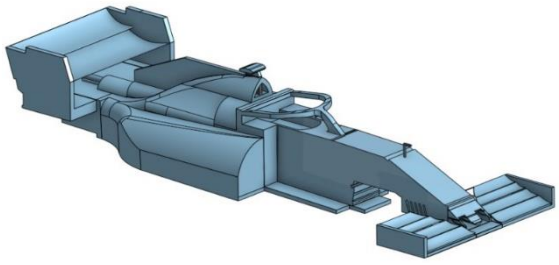
Year 8 Design & Technology: Belt Driven Car Kits

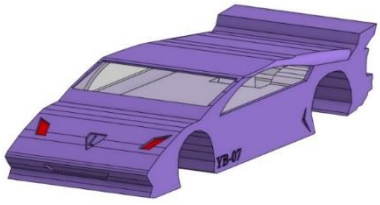
Jamie Mazzetti – TAS Teacher (NSW

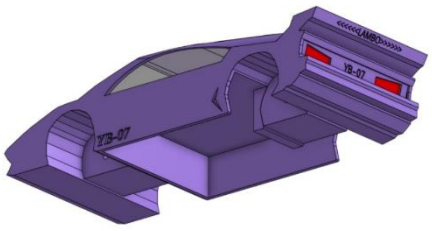
One of the projects that Year 8 Design and Technology were working on this year (2020) at William Clarke College was 3D modelling a vehicle body shell, with the end goal of making it work with the Belt Driven Car Kit from Scorpio Technology.

Students were introduced to using CAD for the first time and over a term developed the CAD model completely from scratch, 3D printed it and then assembled it together with the kit. The body shells were sketched off a side view of an existing vehicle of their choice, then extruded to create a 3D body shell.

The challenging part of this task was designing the body shell to achieve the desired aesthetic and also house the components from the kit in a way that enables all the parts to work together. This was a challenge that required a lot of time, planning, problem solving and attention to detail – all which Year 8 had stepped up to.







A big **thank you** to Technology and Systems teacher **Jamie Mazzetti** for sharing how he used Scorpio's Belt Driven Car kit. Do you have any ideas to share? We'd love to hear from you!

Can you come up with uses for these, or even a small kit?

We have stock of small and large leaf switches but rather than them sitting idly on the shelf we'd like your ideas how you could use them.

Leaf Switches are used in situations where you require momentary on / off switching. They are commonly used in electric toys, household appliances, burglar alarms, electronic communications, game players, car security devices, intelligence systems, joysticks and pinball arcade games. ***We'd love to hear ideas where you could use them in Technology classroom!***

LEAF SWITCH – SMALL
Code: LEAFSS

50V 0.5Amp. Operating Force: 100g (max).

LEAF SWITCH – LARGE
Code: LEAFSL

12v 1 Amp. Operating Force: 100g (max).

SALE AND CLEARANCE ITEMS

VIEW-THRU™ RELATIONAL GEOMETRIC MODELS
Code: 31043
Years 3–8/9
Demonstrate volume with liquid or dry material.
Set includes 8-page Activity Guide, hemisphere, sphere, pyramid, cone, cylinder, cube and rectangular prism. Inner dimensions measure 10 cm.
Use the bases to compare plane surfaces.

STEM – MONOCOT
Code: BM0016

Model of monocot stem of maize, showing vascular bundles in transverse section.

- Moulded Monocot Stem Model
- Clear detail
- Plastic Base (Dimensions: 40 x 37cm)
- Key Card Included (Highlights key anatomical features)

SHORTAGES AND PRICE INCREASES:

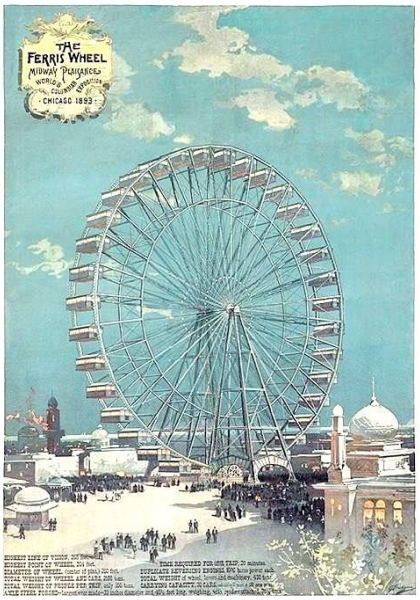
This year you can expect to see a price increases in many products we all use. The Covid-19 pandemic and natural disasters have meant that many resources (e.g. as butadiene, silicon and natural rubber) have been diverted to provide PPE equipment. This has led to shortages and supply issues in other areas. These shortages can be expected until the end of 2021.

These shortages may result in items being delayed from overseas suppliers. Scorpio will be working hard to make sure that your requirements are, as always, supplied in a timely manner.

DREAM BIG AND MAKE IT HAPPEN

(or George W.G. Ferris "*The Man with Wheels in his Head*.")

Article written by Anita Vejins



" I see nothing in space as promising as the view from a Ferris wheel."

E. B. White

American writer

(1899 – 1985)

The Ferris wheel built for the "World's Columbian Exposition" became a marvel of modern engineering and steel forging. A structure of this size and shape had never been built, which meant that the science behind it had not yet been tested. It became the blueprint for Ferris wheels and observation wheels across the world.

The year is 1893. Chicago was making plans for the "World's Columbian Exposition". It was determined to outdo Paris' Eiffel Tower that was constructed for the World's Fair in 1889.

Chief architect of the Columbian Exposition, Daniel Burnham (architect of the first "skyscrapers"), put out the call for engineers to design something special and "**make no little plans**". The concept needed to be "**something novel, original, daring and unique**." Proposals were submitted but were quickly turned down. This included George W.Ferris' observation wheel which was deemed too fragile.

The observation wheel was a large wheel on which people sat, were spun around allowing them a magnificent view of the fair and city beyond. The project was only accepted after George W. Ferris proved the validity of his idea.

THE DESIGNER

George Washington Gale Ferris Jr (1859- 1896) was a Civil Engineer. Ferris worked on railroad and mining projects, building bridges and tunnels. He owned two successful companies G.W.G. Ferris & Co, Inspecting Engineers and Ferris, Kaufman and Company to work on engineering projects. He became one of the foremost experts in projects involving structural steel.

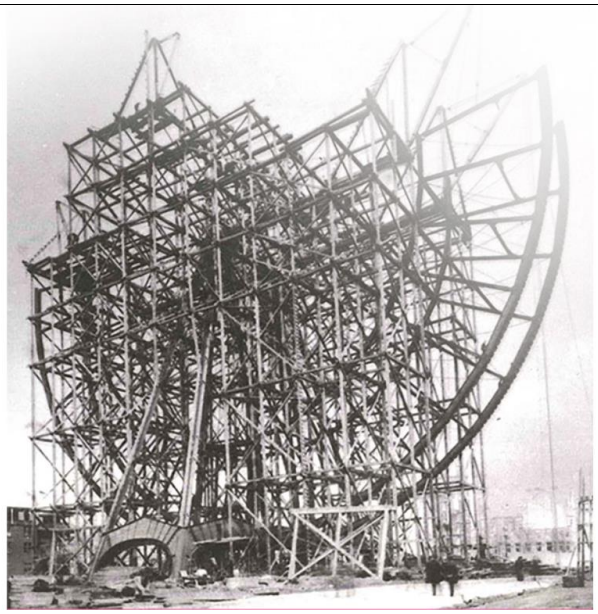
OBSTACLES FACED

The problems George W.G. Ferris faced are the same today's observation wheel designers face today: how to build a wheel larger than any previously built, permission to build at a desired location, how to finance such a gigantic project, etc.

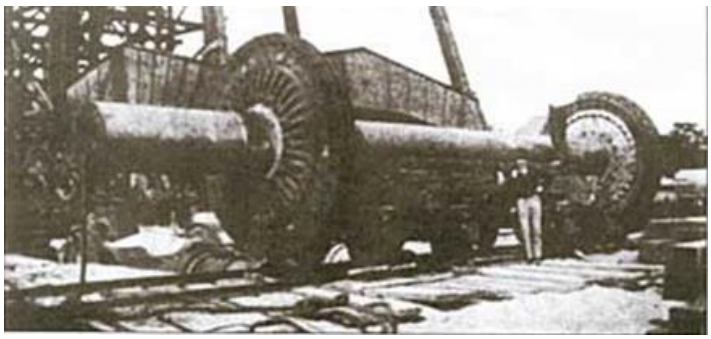
1. **New design concept** –The idea of a "pleasure wheel" was not new. It had been around in some form since the 1600's.

   William Somers, a carpenter was building 15.24 m (50-foot) wooden wheels at Asbury Park, Atlantic City and Coney Island. His patented his "roundabout"design.

   What was different? The size, materials used, manufacturing methods, precision of the machine work, the manner it was turned and the volume of passengers it could carry. The buttressed steel wheel of this size and design had never been constructed before.



Construction was a massive task.



The huge steel forged hollow steel axle of the Ferris wheel.

2. **Timeframe** – from the time the project was approved there was only Ferris had only 22 weeks to complete construction whereas the Eiffel tower took 2 years to construct.
3. **Finance** - He spent $25,000 of his own money on safety studies, hired more engineers, recruited investors. When the project was accepted Ferris was required to find his own financing for the massive project. Ferris formed a joint stock company, attracted wealthy investors. He arranged for financing up to the amount of $400,000. The Ferris Wheel Company was to retain $300,000 received from the sale of tickets, after which one-half of the gross receipts were to be paid to the Exposition.

4. **Weather** – The wheel needed to withstand strong winds and Chicago's cold winters. Construction began in winter. The ground was so hard that concrete needed to be heated to stop it freezing.

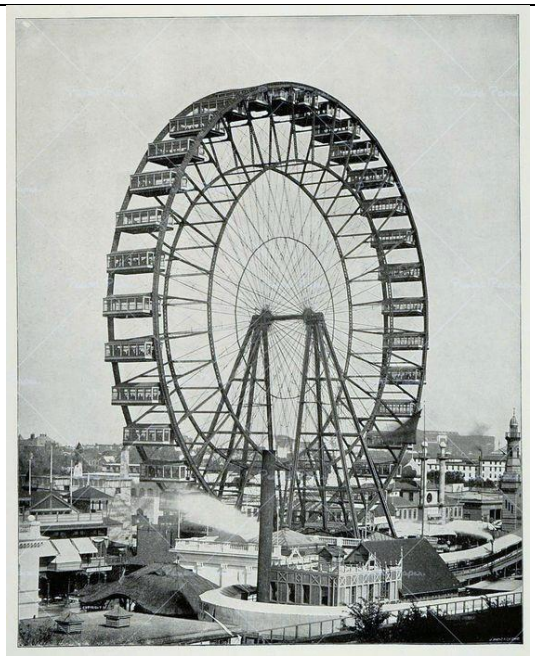
5. **Materials** – Most of the wheel was made of steel. George W.G. Ferris had a great knowledge of steel which he was able to utilise. For several years, he had worked on railroads and mining ventures and was one of the first to make a profession of testing materials and structures.

6. **Forces** – Objects that have a circular motion undergo a "**centripetal force**". Centripetal force always points to the centre of the circle. This means the forces are not balanced. Ferris wheel physics is directly related to **centripetal acceleration**.

7. **Manufacturers** – Due to the timeframe the steel components needed to be manufactured by several local machine shops and manufacturers. Great precision was required as few of the parts could be assembled until they were on site. The axle was the largest hollow steel forging ever produced in the world at the time.

8. **Co-ordination** – between the Construction Chief (Project Manager), steel manufactures and many others. Most correspondence was conducted by telegram.

9. **Construction** – A Ferris wheel is an example of a **wheel and axle simple machine**. The wheel resembled a bicycle wheel. It had heavy steel beams that acted as spokes to maintain the wheel's shape and balance. The wheel was supported by towers and the axle. Most of the wheel required onsite assembly.



The giant wheel towered over the surroundings.

View of the gondolas hanging from the wheel,

STATISTICS & FACTS

- Ferris wheel was launched at the Exposition on 21 June, 1893 and operated at the Exposition for 19 weeks.
- 80.4 metres high (equivalent to a 26 storey building), a diameter of 76 m and a circumference of 240 m. It weighed 3630 metric tons.
- The centre axle was 84 cm in diameter and 13.9 m in length. It weighed 42.2 metric tons.
- The steel towers supporting the wheel 43.9 m above the ground were anchored in 9.14 m of concrete.
- More than 100,000 parts went into the wheel.
- A power plant was built to turn the giant wheel. It was operated by either of two 1000 horsepower reversible steam engines. One engine was on standby. It was stopped by an oversized air brake.
- It was built to withstand 241.4 km/h tornado force winds.
- More than 3000 of Edison's new incandescent light bulbs adorned Ferris' wheel.
- It had 36 passenger cars (gondolas). Each one could carry 40 (seated) to 60 people. A total of 2,160 passengers at one time. Gondolas were about 3.96m wide, 8.3m long and 2.74m high.
- Each ride lasted 20 minutes. A trip consisted of one revolution, during which six stops were made for loading, followed by one nine-minute, nonstop revolution. Rides cost 50 cents.
- It was the greatest single attraction at the Columbian Exposition. It attracted over 27 million visitors. The gross earnings were $726,805.50, of which $513,403 was retained by the company, giving them a profit of $395,000. The Ferris wheel saved the Exposition from financial disaster.

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