

# Scorpio Technology NEWSLETTER



## WELCOME



With the academic year drawing to a close most schools are well into their program planning for 2020. Please contact Scorpio if we can help with this process. For 2020 orders see page 2.

All Scorpio's comprehensive catalogues are online and are regularly updated.

## INSIDE THIS ISSUE

 Page 1

**STEM at Primary – End of year ideas**  
**Teacher Conferences & Workshops**

 Page 2


**Secondary Robot Buggy for PICAXE or ARDUINO**

 Page 3

**This Month's Q&A Technology Tips:**  
**Picaxe and Arduino**

 Page 4

**Wordsearch – Design and Technology**

 Page 5 and 6

**Article – Clocks – A Journey Through**  
**Time & Craftsmanship**

**Our office will be closed from**  
3 p.m. on the 20<sup>th</sup> December  
2019 until 9.00 a.m. 20<sup>th</sup>  
January 2020 Please contact  
by email  
[sales@scorpiotechnology.com.au](mailto:sales@scorpiotechnology.com.au)



### TEACHER CONFERENCES & WORKSHOPS

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



**ITE (was IIATE)**- 27–29 November 2019  
**DATTA VIC** - 6<sup>th</sup> December 2019:  
*Makerspace Conference*

## STEM AT PRIMARY – END OF YEAR IDEAS



With the end of the year approaching students need additional motivation to keep learning.

We've put together some ideas that we believe would be perfect! Our online catalogues have many more ideas. Some items are available as kits but others are a mix and match to suit your requirements.

- **Magnetism** – a range of magnets available
- **Simple electrical circuits**
- **Simple vehicles** – The Blue Brothers series provides a fun and educational learning experience.
- **Deconstruction** – children love to take things apart (to tinker). Parts can be used in a Makerspace area to construct a huge range of items. Try this idea: construct Art works. These could be sold or auctioned to raise money for equipment or class projects. The students could be entrepreneurs during this process – make, market, advertise, sell.

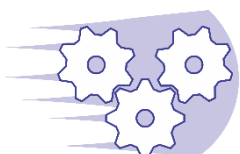
Outside activities could include:

- **Simple machines** – investigate pulleys, what can you lift? Weight of items? What pulley system works best?
- **Magnification** – Use a magnification glass to look at Nature close up. A firm favourite for all age groups.

### 5 STEPS TO REACH A GOAL



1. **Set goal.**
2. **Make plan.**
3. **Get to work.**
4. **Stick to it.**
5. **Reach goal.**



**SCORPIO TECHNOLOGY** Vic Pty Ltd  
1/31 Dalgety St. Oakleigh Vic 3166  
[www.scorpiotechnology.com.au](http://www.scorpiotechnology.com.au)

November 2019

## ORDERS FOR 2020

Many teachers prefer to pre-order goods for 2020 classes. We offer two alternatives.

1. Place order and accept delivery before the end of the school year to get goods at 2019 prices. Payment of invoice in 2020. (**Best deal**) OR
2. Place-order for delivery at the start of the next school year at 2020 prices.

**Our office will be closed** from 3 p.m. on the 20<sup>th</sup> December 2019 until 9:00 a.m. 20<sup>th</sup> January 2020. If you require any assistance during this time please email us at [sales@scorpiotechnology.com.au](mailto:sales@scorpiotechnology.com.au)

## NATIONAL TECHNOLOGIES TEACHER SHORTAGE

During Design and Technologies Week October 2019 a **DATTA Australia** published the report "**National Overview 2019**" highlighting the need to address the current shortage of trained Technologies teachers.

A copy of this report can be found on the DATTA Australia website <http://www.dattaaustralia.com/> and on the Scorpio Technology website [www.scorpiotechnology.com.au](http://www.scorpiotechnology.com.au) in the newsletter section. We encourage you to take the time to read the report.

All enquiries should be directed to DATTA Australia President Peter Murphy - [pl@datta.vic.edu.au](mailto:pl@datta.vic.edu.au) / 03 9349 5809

## SECONDARY – ROBOT BUGGY



The **ROBOT BUGGY** project is an Add-on project that is designed to be used with **PAT'S 14M2 MICRO-CONTROLLER**. It is a fun project that is aimed at expanding the student's knowledge and experience of programming that was introduced by building the original microcontroller.

This buggy will go forward, left or right (but not in reverse). It can be programmed for manual control (using the downloaded program), or can be controlled by use of the Infra red Add-on kit.



We now also offer the **standard version** (BUGGY2WD) that allows you to use Arduino to code the **ROBOT BUGGY**. This version allows the vehicle to travel in reverse as well as the other control functions.

Check out this months **Q&A Technology Tips: Differences between Picaxe and Arduino.**



Try out both versions of the **ROBOT BUGGY** to make your own list of advantages and disadvantages of using PICAXE microcontrollers and Arduino.

ITEM NAME	CODE	PRICE
ROBOT BUGGY	BUGGY	\$19.50
BUGGY 2WD ROBOT	BUGGY2WD	\$18.20

# This Month's Q&A Technology Tips: Differences Between Picaxe And Arduino

## PICAXE microcontroller

### PIC - Peripheral Interface Controller

The PICAXE is a pre-programmed micro-controller with a BASIC interpreter. The single chip can have files loaded to it that it then interprets. This means it's relatively slow, but it is incredibly cheap. It was specifically designed for school children to use without the need for complex coding instruction and knowledge.

The PICAXE microcontroller is pre-loaded with the PICAXE bootstrap code. This enables it to be reprogrammed.

## ARDUINO

The Arduino isn't a 'microcontroller' but a complete development platform with its own standards, integrated development environment (IDE) and programming interface (API) used to develop concepts and code.

The Arduino is programmed with a boot loader. A boot loader is a small memory resident program that loads the code you write. There is a large body of code and add on boards called shields.

Arduino have marketed the product extensively to schools.

### Advantages of the PICAXE:

- Easy to learn to use and program
- Inexpensive
- Simple to program – younger students can start generating programs within an hour of first use,
- Uses BASIC programming language
- The built in interpreter has many functions you just call in program without the need to understand the coding.
- The PICAXE microcontroller circuit is programmed with a download serial cable. It can be programmed on the project board eliminating the chance of damaging the chip.
- The PICAXE "Programming Editor" software is free.
- They come in a range of chips from 8 pin (14,18,20,28) to 40 pin
- PICAXE microcontrollers have a high level of built in personal static protection into each pin. Perfect for educational use.
- PICAXE microcontrollers can be reprogrammed up to 100,000 times without the need for an expensive programmer.
- PICAXE has a number of project board kits and PCBs available.
- Great resources available on website [www.picaxe.co.uk](http://www.picaxe.co.uk)
- Help file are available from the forum within the technical support section of the PICAXE website [www.picaxe.forumco.uk](http://www.picaxe.forumco.uk)

### Advantages of the Arduino:

- Easy to learn to use (not program)
- Cost is greater (unless using cheaper imports)
- Programming language is harder to use and debug.
- Uses C++ coding language
- A program is called a sketch in Arduino. It is a list of instructions to be carried out in the order that they are written down.
- A large amount of projects and resources that are free online due to large user community
- Wide array of sensors
- Suits more serious and complicated project requiring speed and memory space
- Open source in software and hardware
- Arduino community [www.arduino.com/forum](http://www.arduino.com/forum)

### Disadvantages of the PICAXE:

Download serial cable is required to transfer program.

### Disadvantages of the Arduino:

- If you need more processing power and working memory Arduino isn't the perfect solution.
- Using programs and projects from the internet can teach some bad habits.

**The choice of PICAXE, Arduino, and PICs is ultimately up to you so have fun trying!**

### REFERENCES:

- [Programming and Customising the PC – Microcontroller](#), Third Edition, by Myke Predlko (McGraw-Hill), Copyright 2008 ISBN 978-0-07-147287-6
- [Getting Started with Arduino](#), Third Edition, by Massimo Banzi and Michael Shiloh (Maker Media). Copyright 2015. ISBN 978-1-4493-6333-98
- [Programming Arduino: Getting Started with Sketches](#), Simon Monk (McGraw-Hill) Copyright 2012 ISBN 978-0-07-178422-1

- <https://www.electro-tech-online.com/threads/picaxe-vs-arduino-which-is-better.119942/>
- <https://forum.arduino.cc/index.php?topic=453283.0>
- <https://www.quora.com/What-is-the-difference-between-arduino-and-pic>
- [https://www.researchgate.net/post/What\\_are\\_the\\_advantages\\_and\\_disadvantages\\_of\\_arduino\\_compared\\_to\\_microcontrollers](https://www.researchgate.net/post/What_are_the_advantages_and_disadvantages_of_arduino_compared_to_microcontrollers)



# DESIGN AND TECHNOLOGY

AESTHETICS  
BRAINSTORM  
BRIEF  
CIRCUIT  
CODING  
CONCEPTS  
CONSTRAINTS

CRITERIA  
DESIGN  
DEVELOPMENT  
ELECTRONICS  
ENGINEERING  
ERGONOMIC  
EVALUATE

INNOVATE  
MATERIALS  
PLANNING  
PROCESS  
RESOURCES  
ROBOTICS  
SAFETY

SKILLS  
SPECIFICATION  
STEM  
SUSTAINABILITY  
SYSTEMS  
TECHNOLOGY  
TESTING

Y T I L I B A N I A T S U S T M S F T K  
O A S J E T J N O D G N I N N A L P I I  
J C F C R N N N E I B O E J C L A L U H  
H V I E I O G S F R T M E Q T F I W C A  
M J C M V T I I A Q P A S A G E R A R E  
K K S A O G O I N O N S C K U I E O I S  
C X T R N N N B L E E A E I K R T J C T  
O E N P T S O E O C E G H M F B A H I H  
D P I Q T B V G O R K R E N V I M G N E  
I Z A O Z E J R R Q M G I L D E C L N T  
N R R T D V P U T E C E R N T S Q E S I  
G M T E L E C T R O N I C S G O V E P C  
H S S C D T Y G O L O N H C E T C V Z S  
K D N L R T E Y T E F A S R X R X A S Z  
Q E O C L I U S P G A U R I U I L L C A  
N L C U I I T U T D I Y N O N R O U W E  
W R R R A M K E O I D P S F J A Y A I W  
I A L M S M H S R M N E I X O K F T I D  
M Q E O T P O B L I R G X S Y S T E M S  
K G Y N Q R P B W U A C O N C E P T S F

<http://puzzlemaker.discoveryeducation.com/code/BuildWordSearch.asp>

# CLOCKS – A JOURNEY THROUGH TIME & CRAFTSMANSHIP

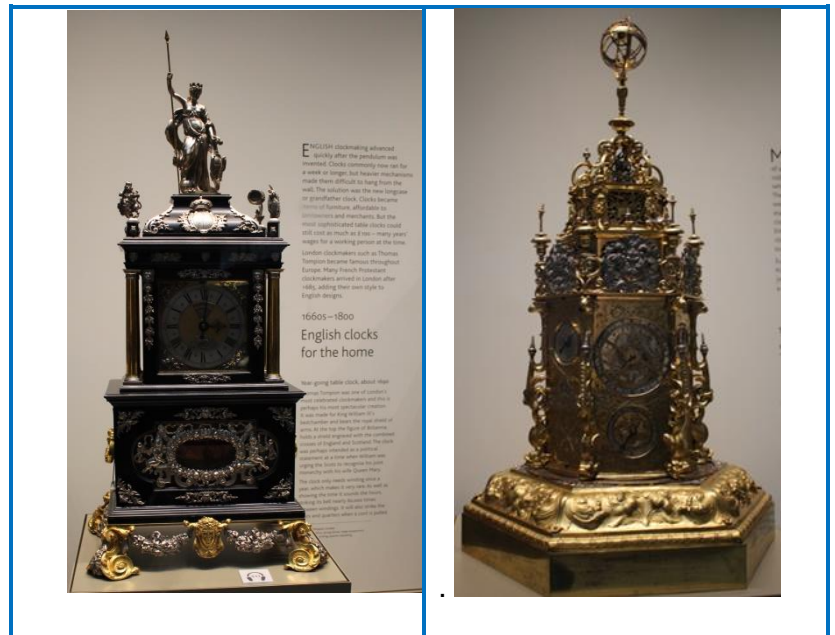
Article written by Alex Kapoyanis  
Photos from personal collection



**Clocks are an amazing invention of humanity. Although some form of “clock” has been around for a long time, such as Sundials, the ability to keep time in the form of mechanical clocks has only been around since the early to mid-14<sup>th</sup> Century.**

Early models were not very accurate and it wasn't until the introduction of the pendulum clock by the Dutch scientist, Christian Huygens, in the mid-1600s, that their accuracy vastly improved. Galileo and his son had already experimented with the pendulum, however, they never actually build a pendulum clock.

A recent tour through the **British Museum's clock exhibition** in London revealed many intricate and interesting clocks that have been manufactured over the last few centuries. It is not only the mechanism that is fascinating, but the elaborate and intricate clock faces or cases that have been crafted for these clocks.



***“The mind of man is like a clock that is always running down, and requires to be constantly wound up.”***

**William Hazlitt (Writer)  
(1778 – 1830)**

Irrespective of whether these clock faces or cases have been intricately carved out of local or exotic woods; decorated with gold or have had beautiful pictures delicately painted by an artisan or manufacturer, clocks have certainly evolved over the years.

Mechanical clocks have since been replaced by more accurate Quartz movements. Well, not totally. A recent tour of Buckingham Palace's State Rooms revealed that the amazing royal collection of more than 1000 clocks still function using a mechanical mechanism. Each and every timepiece is manually wound back or forth at the change of time in Autumn and Spring.



Clock making gives **Design & Technology** student so many options for creativity. Whether it be in woodwork or metalwork class, students have a range of manufacturing and design options available to them. They can design their own functioning clock faces using one of Scorpio Technology's Quartz movements finished with a range of hour, minute and second hands. Alternatively, students can design the body or case of the clock and use one of our selection of insert clocks. There is even the option of creating a pendulum clock, too.

One thing is certain – clock design and manufacture can be an amazing experience for students with the end result being something that they can actually use for many years after its completion (...with only the occasional change of batteries).



**“Masterpiece Clock”** made in Germany (1620) by Thomas Starck, is more complicated than it appears. It displays the time, weekdays, shows when eclipses are most likely to occur, measures the length of day and night throughout the year and more!



**“Ship Clock”** - Mechanical medieval galleon intended to announce banquets at court. Played music, shot its cannon and moved down the table. Produced in Germany around 1585 by clock maker Hans Schottheim.



#### REFERENCES:

- <https://www.thoughtco.com/history-of-mechanical-pendulum-clocks-4078405>
- <https://www.theclockdepot.com/clocks-blog/history-of-the-pendulum-clock/>
- <https://www.rct.uk/collection/themes/trails/keeping-time-clocks-in-the-royal-collection>