Introducing STEM Into The Classroom

IT'S REALLY NOT THAT HARD!!

Introducing STEM

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- Principal 30 Years
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- WHY TEACH STEM?
- As the society changes, there is a shift in vocational needs from manufacturing to high end design computer based skills. It take upward of 20 years to change the direction of an education system. The demand for designers and coders (computer programmers) is tipped to grow by millions worldwide in the next decades.

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- WHAT IS STEM?
- S – SCIENCE
- T – TECHNOLOGY
- E – ENGINEERING
- M - MATHEMATICS

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- YOU CAN ADD ARTS TO MAKE
- STEAM!!
- Each component forms part of the same unit of work or even lesson!

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- COMPONENT PARTS:
- SCIENCE – There are two elements to a Science Program
- 1. Understanding a particular Science concept.
- 2 Science Method

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- Science method: An experiment is designed to test one variable.
- All other aspects of the experiment MUST remain the same!!

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- TECHNOLOGY
- TECHNOLOGY MODEL:
- DESIGN
- BUILD
- TEST
- OPTIMISE THEN TEST AGAIN

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- ENGINEERING:
- What is the best way to build your design?
- What tools and processes do I need?
- Can I make it more effectively?

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- MATHEMATICS:
- Mathematics is a key component of just about everything we do. It involves collecting processing, analysing and presenting data.

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- **STEM AND COMPUTER SKILLS**
- Computer skills are a key component of STEM.
- Robotics and coding commence in the first years of primary school and develop throughout the school.
- 3D printing is another key component of a STEM program, mainly at secondary level. There are programs such as Design Spark which students can use for design.

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- WHY STEM?
- We all learn more effectively by doing. Practical learning takes our conceptual understanding and allows us to apply it in a real life situation. This builds and deepens our ideas and concepts and allows us to effectively develop our ideas.

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- STEM IN THE PRIMARY SCHOOL
  - A few words about Piaget!

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Concrete operational Abstract concepts	7 to 11 years old	More logical and methodical manipulation of symbols. Less egocentric, and more aware of the outside world and events.	

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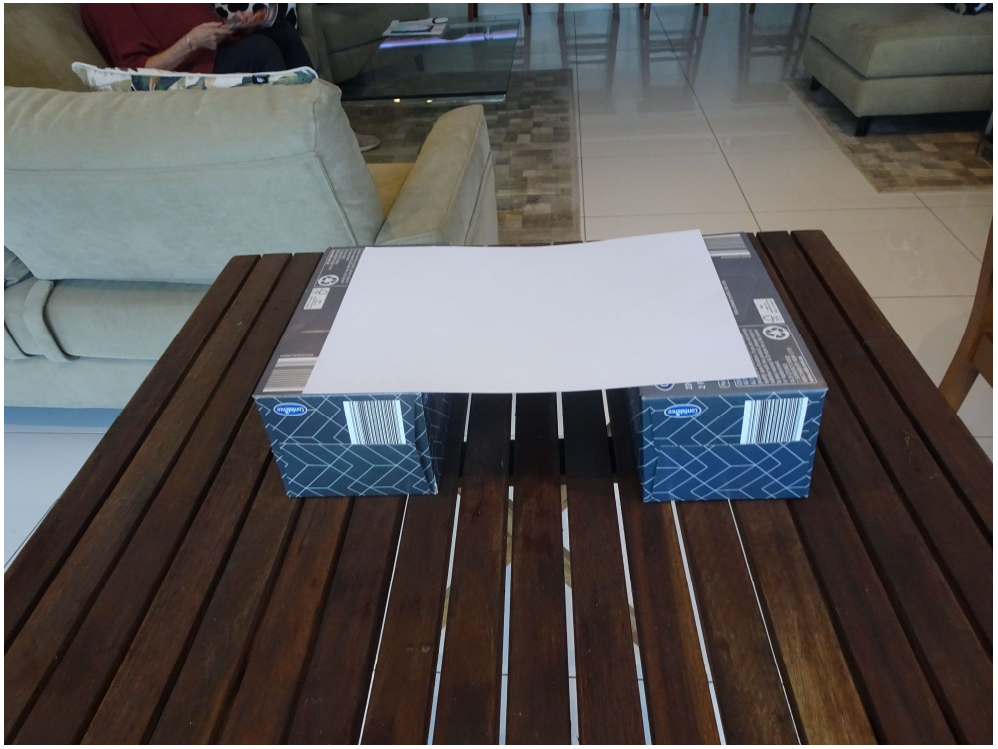
- What does a STEM unit/lesson look like?
- Each component of STEM is represented.
- Practical focus

Introducing STEM - MATERIALS

- Science – How much weight will a piece of card hold? What are the properties of the card?
- Can we make it hold a greater weight?
- Technology – Can we increase the amount of weight supported?
- Engineering- Using ideas to modify the shape of the cardboard
- Mathematics - Measuring, comparing and presenting performance data,

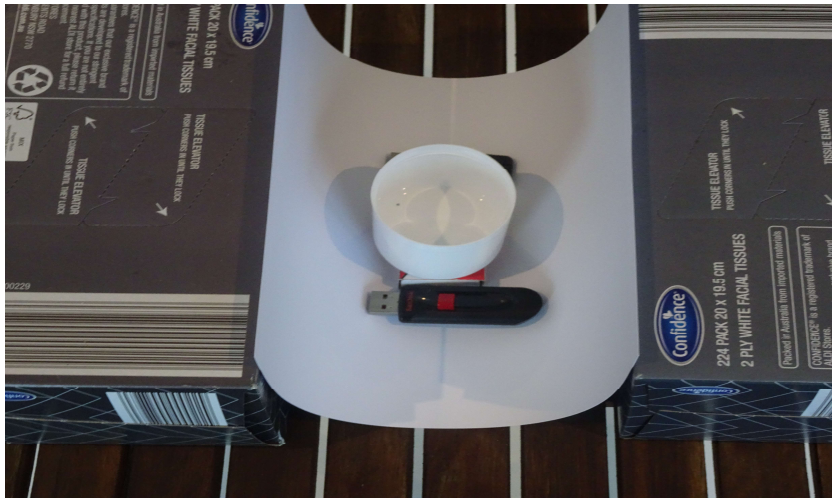
Introducing STEM - MATERIALS

- Take a piece of thin card. Place it between two tissue boxes.



Introducing STEM - MATERIALS

- Collect some light objects. Measure them on some kitchen scales.
- Place one by one in the middle of the card until is collapses.
- Note the weight held.



Introducing STEM - MATERIALS

- Now alter the card by folding and bending it. The card must still bridge the gap between the two boxes.
- See what weight it will support. Has altering the shape of the card increased it capacity to bear weight?

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- The children can make a list of the changes they made and the total weight for each modification to the card.
- They can photograph the process and make a booklet of their project.
- And now lets see just how much the card can hold if modified!!!

Introducing STEM - MATERIALS

- In my experiment, the unmodified cardboard held 33grams.
- So how much would the same sheet hold if folded?

Introducing STEM - MATERIALS

- If you corrugate the cardboard it will hold well over the 757 grams shown in the picture below!!

Introducing STEM - MATERIALS

- The children can explore lots of different modifications to the cardboard to make it stronger. One that I have not explored today is the strength of arches, which are more difficult to get to support objects due to the semi-circle on top!
- This unit can lead on to a huge amount of work on bridges.

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- Every adult who interacts with students has the power to determine what kind of butterfly we produce. Our role is to teach, coach and encourage, but most of all to inspire them to develop the passion that will sustain them for life!

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When we look at a caterpillar, we would never know that one day it will be a butterfly!