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The STEM Challenge: Hands on Activities Designed to Engage Students & Develop Skills in Collaboration, Problem-Solving and Critical & Creative Thinking

In STEM education, in recent times, we have placed a much larger emphasis on the need to teach what is often described as soft skills; critical and creative thinking, resilience or grit, teamwork or collaboration. But in such a content-driven and crowded curriculum how do we manage to incorporate these skills? How also do we ensure that the delivery of necessary content and skills for subjects such as Maths and Science isn't overly dry?

Challenge activities provide the ultimate means for STEM teachers as well as regular classroom teachers to create a more stimulating learning environment for the students. Sometimes it provides just the right spark for students and teachers to get through long term. Whilst having fun students are also gaining the opportunity to develop their teamwork, resilience and critical and creative thinking skills.

Over the 5 years that I have taught STEM at Northern Bay College I have developed a number of Challenge Activities for the students as well as the resources to go with them which can be taught within a 1 to 2 hour lesson. I work mostly with Year 7/8 students, where there is a high level of disengagement, and often rely on Challenge Activities to provide the spark in the classroom. Throughout the term students work on multi-week design projects, but I find a Challenge Activity can be great at the start or end of a term, or in between major projects to increase levels of engagement.

Whilst having fun students are also learning about Science concepts such as Gravity or Friction (ie. In the Marble Run or Roller Coaster Challenge), Aerodynamics (in the Hover/Wind Tube Challenge), or in Maths students have developed their skills in measuring angles by building catapults. Students are also motivated to learn with an end-goal in sight (eg. By learning about angles students realise that they can fire a cannonball further).

During my workshop I will provide a sample of 6 of my favourite Challenge Activities and allow the participants a chance to get hands-on and have a go at completing each of the challenges. I will also discuss my approach to a Challenge Activity, to increase engagement, teamwork, good design and critical and creative thinking skills. I will also go through how teachers can develop their own resources on a minimal budget.