

# Bigger better faster more no more

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12 Dec 2017

I firmly believe that you get the most out of a lab prac if you do it yourself. It is more satisfying and meaningful. You almost feel like a pioneer. Science is never perfect so your results are usually distinctive. Mix in some natural egoism, and your experiment becomes extra special and memorable.

However in South African schools, this can be a bit tricky, what with the very high numbers and low resources. So I took just one piece of new tech, the PASCO Wireless Pressure Sensor, and I posed this question: *if you have just only one of these in the whole primary school, how can you get data ownership?*

Okay, this device measures pressure. You can display and graph results on a computer, smartphone or tablet and it comes with a syringe and some tubing. Primary schools do natural science, which is a combo of life, environmental and physical science. So what would you do?



1. **Inverse Relationships** – As you push down on the syringe, of course the pressure rises. I did this with a customer's smartphone and a room full of 30 participants. One volunteer depressed the syringe and called out the changing volume as my customer ran around displaying her phone, asking everyone to plot the relationship. All the graphs looked a bit different because of scale, and sketching technique, so there is a tiny sense of that *data ownership*, a personal flavour.

Then at the end we asked the groups to multiply all the different pressure volume quantities, which should work out fairly constant. We know the physics works, but I still kind of hold my breath when I punch in the values, which is exciting in a rather geeky way.

2. **Grip Strength** – As we were doing this pressure-volume activity, we teased and cajoled our experimenter. It became more and more difficult to hold the syringe steady as she squeezed the air to smaller volumes. Pressure is just force over area so it is easy for the software to show grip force in newtons or kilograms. You see how almost the same tech configuration becomes a life science experiment? Now the students can experiment on themselves: who can squeeze the hardest? Who can maintain a steady force for the longest time? What about training? This can become an ongoing science research project as hand grip strength is an important biometric indicator, and students are always interested in themselves!



3. **Oxidation** – The pressure sensor includes tubing for attachment to a test-tube. A very cool lab: you use vinegar to strip steel wool of its protective layer and pop it in the sealed tube. Immediately you see the pressure drop as the wool begins to rust. It is a good class scale investigation because it takes time. In about an hour you will see the pressure drop by around 20%. Why? Because that is the oxygen component involved in the rusting reaction.



I recently went through the Education Department's CAPS Curriculum for

Natural Science. They have worked hard to reference commonly available material for practical activities. I hope I have shown that adding a small amount of new experimental technology can really extend the impact of these and other investigations, without consuming major resources. Now, the consumer Christmas spirit seems to be all about bigger, better, faster, more. But maybe the true Christmas spirit is about working together, creatively, to get much more from much less, and to look after each other, and our planet.

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