

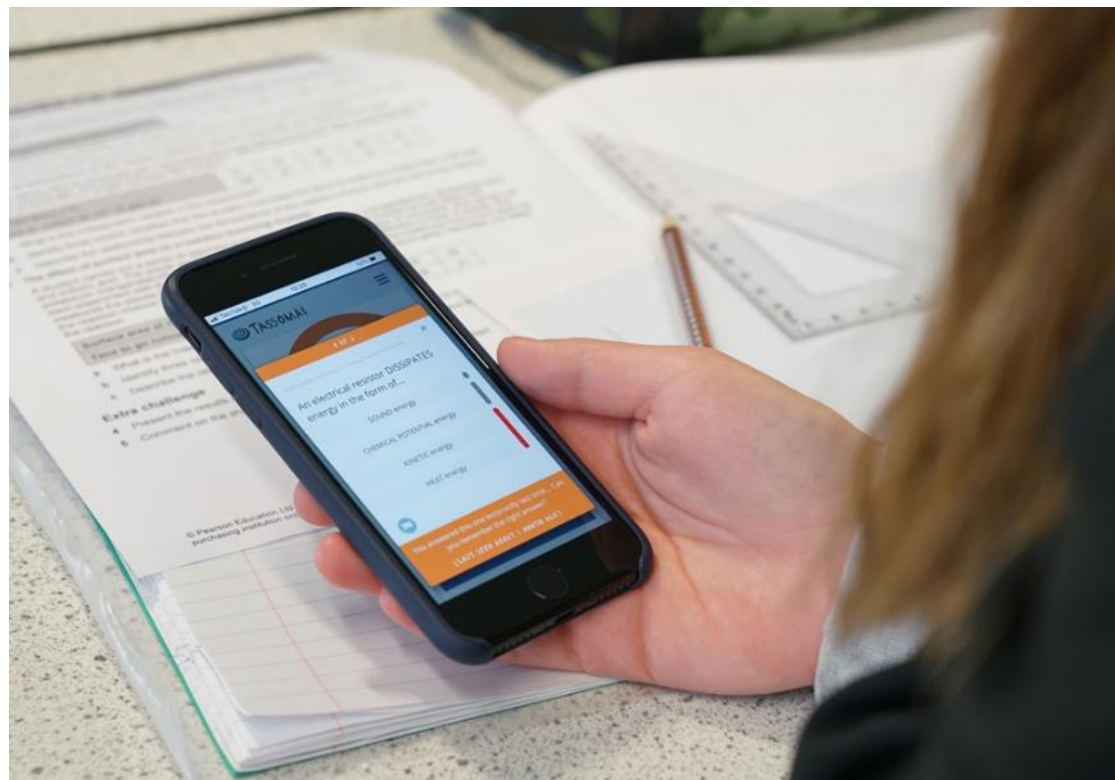
Project 2

Phone-y science

Analytical chemistry in Ireland
[rsc.li/3p00Lfl](https://www.rsc.li/3p00Lfl)

Can mobile phones be used to collect reliable scientific data?

Find student and teacher support and the full project outline at <https://rsc.li/3p00Lfl>



© Tassomai

Discussion

1. Can mobile phones be relied on to give data?
2. Why is it important to have reliable data?
3. How would we be sure it was reliable
4. How easy is it to manipulate the results?
5. Should it be taken without consent?
6. How is it used already?

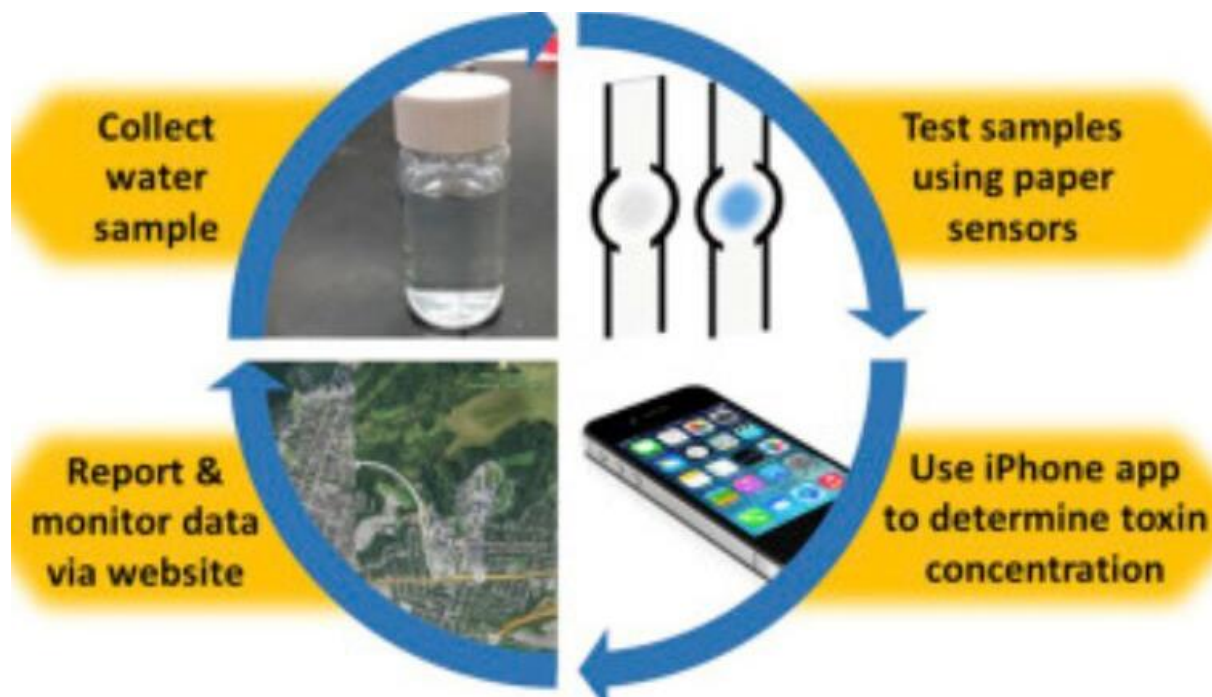
Smartphone eye test



PEEK vision foundation used smartphone technology instead of the usual eye test which uses English symbols and letters to test eyesight of a visually impaired woman in Kenya.

© Rolex/Joan Bardeletti

Water quality



Smart phone technology has also been used successfully to measure water quality, such as chlorine contamination. It could prove very useful in liability cases where industry has been suspected of polluting drinking water reservoirs.

[Image](#) from S Clémence *et al*, *Water research*, 2015, **70**, 360-369



Instrumentation in Ireland

- **Aaron Power**, an RSC member, worked with the team at Environmental Laboratory Services in Cork during his master's degree to improve a method for the detection of small quantities of heavy metal.
- He achieved this by using analytical chemistry instrumentation such as inductively coupled mass spectrometry or ICP-MS. He is currently working in Hovione Éireann in Cork as a quality control technician.



Reproduced with permission from Aaron Power



Instrumentation in Ireland (continued)

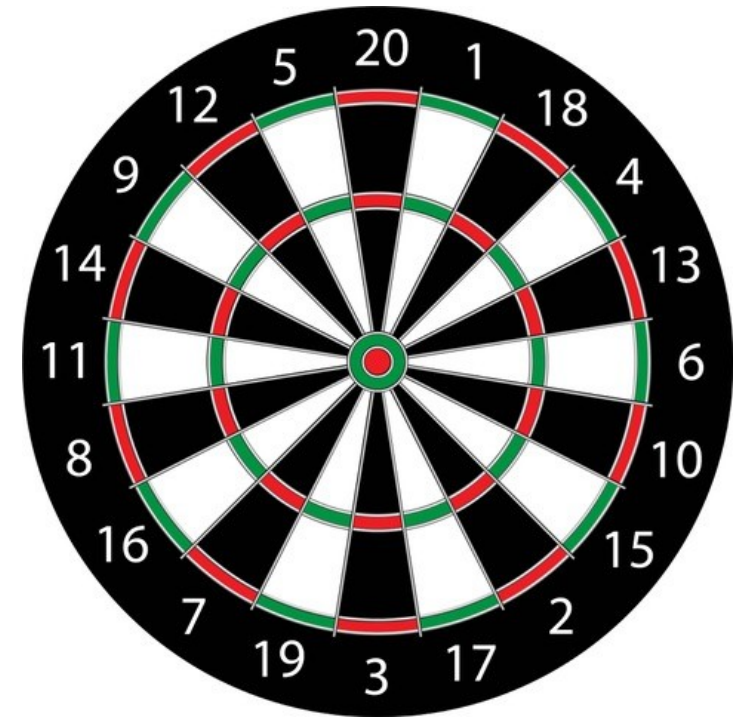
Reproduced with permission from Ryan Siphon Twantwa



Ryan Siphon Twantwa is a quality control chemist at Pfizer. He explains how he must rigorously test the quality of medicines and their ingredients, which requires keen attention to accuracy and precision in order to ensure the medicines they produce are correct, safe and effective for their patients.

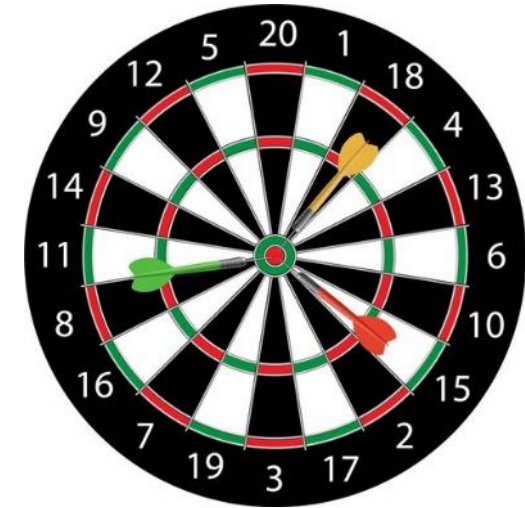
What's the difference between accurate and precise?

Complete the sheet to probe your understanding



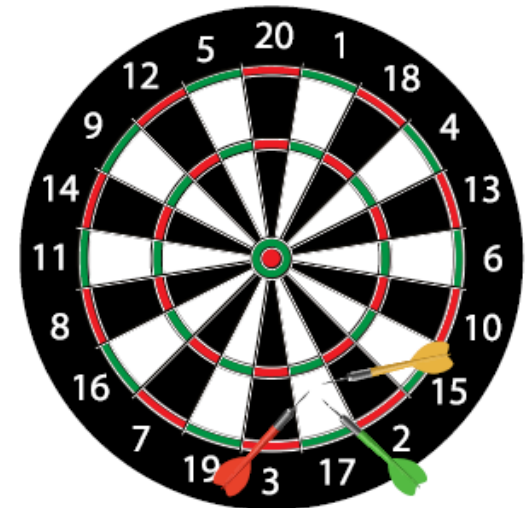
Accurate

As close to the true value as possible



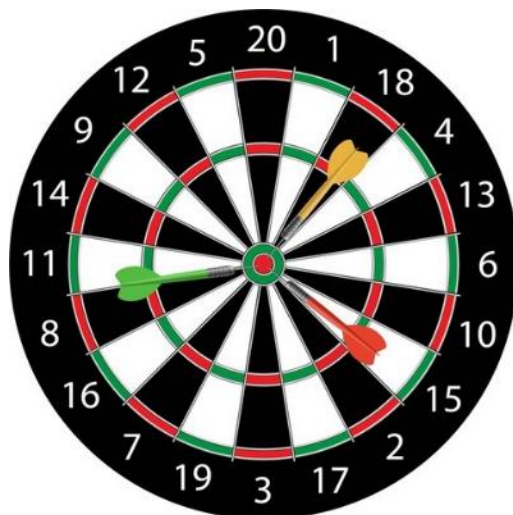
Precise

As close to each other as possible

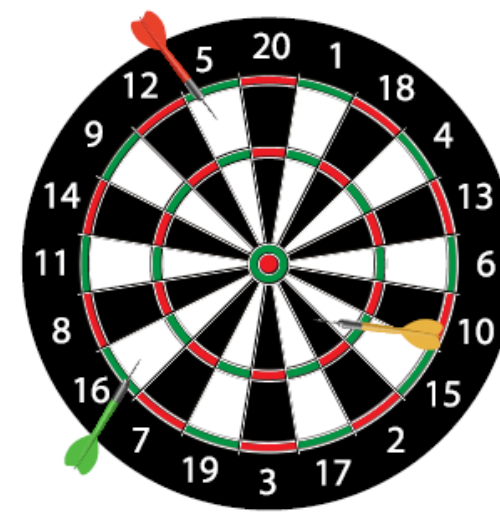




Precise but inaccurate



Accurate and precise



Imprecise and inaccurate

Discuss examples of this in real laboratory situations or when using your mobile apps to collect data.

Is there a relationship between squash concentration and absorption?



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The scientific method



The idea

Something you want to investigate, prove or disprove.



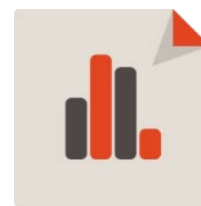
Planning

Think about how you'll carry it out, what you will use and produce a method.



Results

Conduct the experiment and collect the results.



Analysis

Process your results and draw conclusions from them.



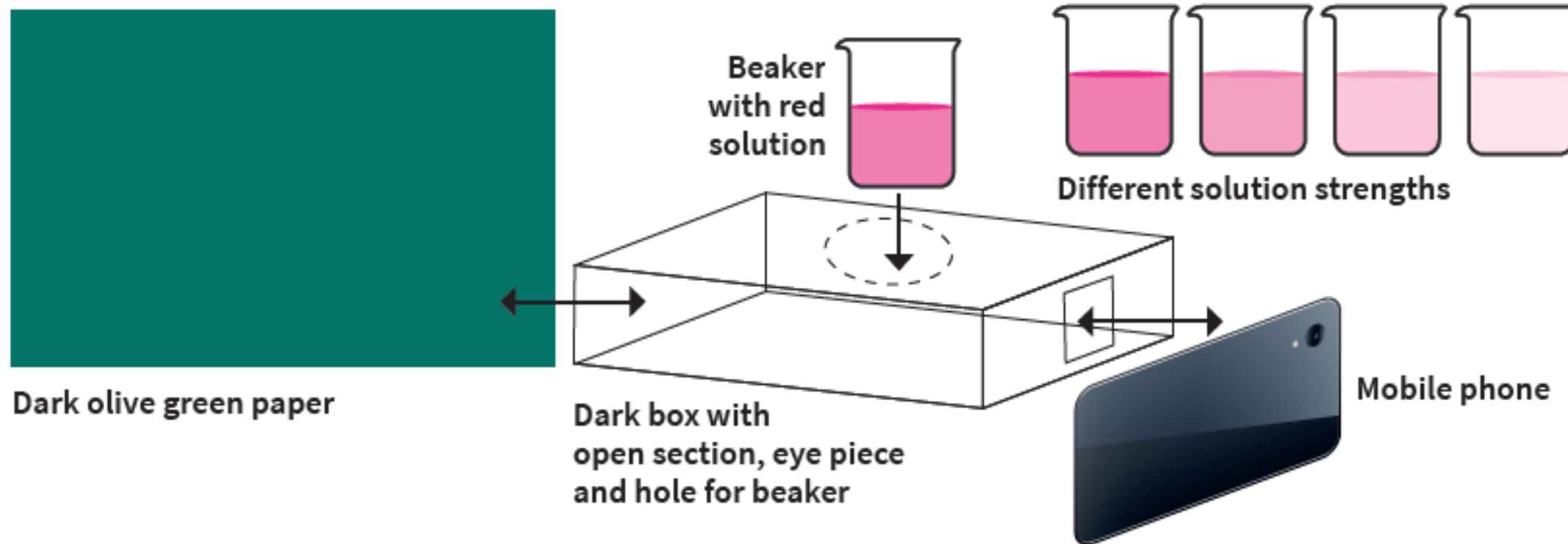
Presentation

Explain what you have found, with a poster, presentation or report.

Investigation

You will carry out your own investigation to detect absorbance of light using a colorimeter app on a phone and various dilutions of fruit juice, or coloured solutions.

How to set up your colorimeter.



You can watch a video to help you get started here <https://rsc.li/3bCk0W2>



Acknowledgments

This work was produced as part of a community project, with contributions from the Royal Society of Chemistry members and staff, industry partners, Science Foundation Ireland and, most importantly, members of the teaching community in Ireland.

Thank you to all involved!

To find out more about SFI's Smart Futures and STEM careers resources for students, teachers and parents, please visit [smartfutures.ie](https://www.smartfutures.ie)

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