

Curiosity: When a Sensor Is Consistent but Wrong

Curiosity Reading | CheAI Research Inc.

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Connection: technology and health devices

Reading time: 5 minutes

Accessibility: This reading has no required visual.

A question worth asking

If a phone sensor gives the same answer every time, should you trust it?

The chemistry story

Imagine a sensor that reports almost the same temperature each time you test it: 22.1, 22.1, and 22.2 degrees Celsius. That close grouping is precision. It says the device is repeatable under those conditions. Now compare it with a calibrated thermometer reading 24.0 degrees Celsius. The sensor is repeatable, but it is not accurate.

Chemists separate those ideas because the repair can differ. Random variation can often be reduced with careful technique and repeated trials. A systematic offset, such as an untared balance or poorly calibrated sensor, can shift every result the same way. Repeating a biased measurement many times can produce a very convincing wrong average.

Numbers also carry information about a tool. A kitchen scale that changes only by whole grams cannot reveal a change of three tenths of a gram. Writing extra digits would make the result look stronger without adding evidence. In chemistry, a sensible number records both a quantity and the limits of the measurement.

Think like a chemist

1. What reference would you use to check a temperature sensor?
2. Which is more useful for a medical device: repeatability, accuracy, or both? Defend your answer.
3. A scale reads 120 g before and after a 0.3-g change. What can you conclude?

Vocabulary bridge

Word	Student-friendly meaning	Where it appears
accuracy	closeness to an accepted value	6, 9, 15, 18
precision	closeness of repeated readings	6, 9, 15, 18
systematic error	a repeatable bias	10, 18
uncertainty	reasonable range around a reading	4, 12

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