

## NS 5.9 (pg 1 of 1)

## Accuracy & Precision

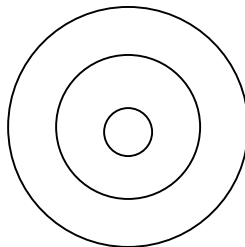
Chemists should concern themselves with the reliability of their measurements. Ideally their measurements are both correct (accurate) and reproducible (precise).

*Accuracy* is a measure of how close a measurement comes to the true value.

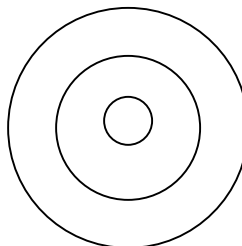
*Precision* is a measure of how close a series of measurements are to one another. Precision reflects the reproducibility of a given type of measurement.

Imagine throwing darts at a dartboard on which you are aiming for the bulls-eye. Sketch a set of 4 or 5 darts that would reflect each of the three situations below.

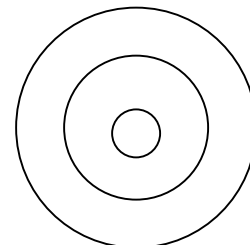
A. good accuracy and good precision



B. poor accuracy yet good precision



C. poor accuracy and poor precision



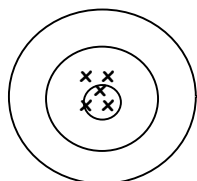
### Random Error vs Systematic Error

- Random error (also called indeterminate error) means that a measurement has an equal probability of being high or low. Since all measurements have some degree of uncertainty, all measurements have some amount of random error.
- Systematic error (also called determinate error) is associated with some flaw in the equipment or design of an experiment. Systematic errors, unlike random errors always shift the results in the same direction, either always high or always low. Systematic errors are much harder to find than random errors because even when they occur, the data "appears" to be good.

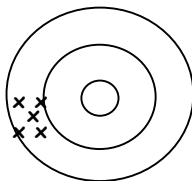
### ANSWERS

- Accurate and precise - represents very little random error and no systematic error.
- Not accurate but precise - represents very little random error but large systematic error.
- Not accurate and not precise - represents large random error and perhaps various systematic errors (but not just one systematic error)

A



B



C

