Critical Work Function: Provide routine facility support

Key Activity: Use equipment correctly according to manufacturer's guidelines

Title: Proper use of a laboratory balance

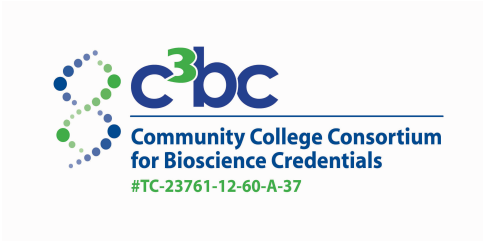
Assessment:

Although not all balances are the same (e.g. they vary in capacity and readability), bioscience technicians should know the general steps for balance calibration and performance verification. Rather than have students memorize how to use a specific balance, it is best for technicians to be comfortable reading and following an instrument's specific procedures for use. Therefor, any time students are using a balance, its user's manual should be readily available for reference.

You can assess a student's ability to correctly use a balance during any exercise in which weight measurements are conducted. Each student should do the following:

- Performance verification
  - Students should verify the accuracy of their balance by weighing a standard weight three times and calculate percent error.
  - In addition to accuracy, students should know how to determine the precision of a balance. Students should weigh a mass standards ten times on a balance and then calculate standard deviation and/or relative standard deviation (i.e. the coefficient of variance).
  - If a student finds that a balance's accuracy is outside of the tolerance reported by the manufacturer, then the student should proceed to balance calibration.
- Balance calibration
  - The student should follow the instructions provided by the manufacturer for correct balance calibration.
  - For balances that use an external standard for calibration, the student should use gloves or tongs to handle the standard.
  - Following calibration, the student should again verify the performance of the balance.
- Tare of weigh vessel
  - Prior to taking sample weight measurements, the student should tare the balance with the weighing vessel on top of the weigh pan.
- Record stabilized reading
  - Students should wait for the balance's reading to stabilize prior to recording the sample weight, but they should also recognize that some samples can change weight as moisture is absorbed or evaporates.
  - If the balance's reading is fluctuating, the student should recognize possible causes and eliminate them. Among other things, a balance's ability to function properly is affected by:

▪ Drafts ▪ Leveling ▪ Vibrations ▪ Jostling ▪ Electrostatic charges • Clean balance ○ Students should always leave the balance that they have used clean.
Resources for teaching: • Seidman, L.A., and C.J. Moore. 2009. Basic Laboratory Methods for Biotechnology Pearson Education, Inc., San Francisco, CA. • Seidman, L.A., M.E. Kraus, D.L. Brandner, J. Mowery. 2011. Laboratory Manual for Biotechnology and Laboratory Science Pearson Education, Inc., San Francisco, CA.



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